DOCUMENT RESUME

ED 326 173 HE 024 079

TITLE	Economic Competitiveness and International Knowledge: A Special Policy Briefing for New Hampshire Legislators.
INSTITUTION	New England Board of Higher Education, Boston, MA.
SPONS AGENCY	AT&T Communications, Inc., New York, NY.
PUB DATE	Nov 89
NOTE	91p.; For related documents, see HE 024 076-081.
PUB TYPE	Reports - Descriptive (141) -- Information Analyses (070)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	*College Role; Economic Change; *Economic Development; Economic Impact; *Educational Cooperation; Educational Needs; Financial Support; Global Approach; Higher Education; *International Trade; Regional Programs; Research and Development; School Business Relationship; Technology Transfer
IDENTIFIERS	*New England; *New Hampshire

ABSTRACT

A policy briefing report discusses the initiatives currently in place in New Hampshire that are designed to enhance that state's economic and educational effectiveness in order to improve its international competitive position. The report is divided into four major areas of discussion: (1) an overview of the global economic challenge and the New England Board of Higher Education project that addresses international competitiveness; (2) New Hampshire's economy within the international context; (3) New Hampshire's programs for enhancing its international economic competitiveness; and (4) the role and development of higher education in New Hampshire in preparing the state for international economic competition. Included in the areas examined are the state's federal and regional resources, state-level strategies, international trade initiatives, educational initiatives, research and development (R&D) investment, and technology transfer and technical assistance. In addition, the concern about a lack of international awareness, what is being done about it, and recent legislative activity are discussed. Recommendations are made in education and training, stimulation of international awareness, R&D investments, technology transfer, and technical assistance. An appendix includes a list of Massachusetts Global Education Centers Programs, a description of the Workforce 2000 Council, and a trade profile for New Hampshire. (GLR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED326173

ECONOMIC COMPETITIVENESS AND INTERNATIONAL KNOWLEDGE IN NEW HAMPSHIRE

Special Policy Briefing for New Hampshire Legislators

NEW ENGLAND BOARD OF HIGHER EDUCATION

Regional Project on the Global Economy
and Higher Education in New England

HE 024 079

U.S. DEPARTMENT OF EDUCATION

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

New England Board of Higher Education

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Connecticut • Maine • Massachusetts • New Hampshire • Rhode Island • Vermont

REGIONAL PROJECT ON THE GLOBAL ECONOMY
AND HIGHER EDUCATION IN NEW ENGLAND

ECONOMIC COMPETITIVENESS AND INTERNATIONAL KNOWLEDGE

A Special Policy Briefing
for
New Hampshire Legislators

November 1989

Prepared
by
The New England Board of Higher Education
45 Temple Place
Boston, Massachusetts
(617) 357-9620

© Copyright by the New England Board of Higher Education 1989
All Rights Reserved

ACKNOWLEDGEMENTS

The New England Board of Higher Education Regional Project on the Global Economy and Higher Education in New England, including the New Hampshire perspective, which follows, has had the benefit of more than two years of staff research prior to the commencement of a series of legislative briefings in each New England state. The Board is grateful to AT&T for partially underwriting this regional project in behalf of state legislators throughout the region. In many respects, AT&T exemplifies the knowledge-based, globally oriented frontier of worldwide telecommunications which will shape international economic, political and cultural affairs as we approach the 21st century.

PROJECT STAFF

John C. Hoy, President, New England Board of Higher Education
Judith A. Beachler, Director of Research, NEBHE
Sven Groennings, NEBHE Senior Fellow
Richard D. King, NEBHE Senior Fellow

This analysis for the state of New Hampshire has been prepared by:

Judith A. Beachler
Director of Research, NEBHE: Data and Policy Analyst

John O. Harney
Assistant to the President for Communication, NEBHE: Editor

To order additional copies of this report, please send a check for $10.00 payable to the New England Board of Higher Education to: NEBHE, 45 Temple Place, Boston, Massachusetts 02111

About NEBHE and the Regional Project on the Global Economy and Higher Education in New England

NEBHE was created in 1955 by an interstate compact initiated by the governors of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont, approved by the state legislatures and ratified by the U.S. Congress.

Each of the six New England states is represented on the NEBHE Board of Directors by eight delegates who are appointed by the respective state governors and legislative leaders.

Basic funding to support NEBHE programs is provided by the six New England states which make annual assessments according to a regional population formula. NEBHE seeks supplemental funding from foundations, corporations and individuals. NEBHE is a private, nonprofit educational organization granted 501(c)(3) status by the U.S. Internal Revenue Service.

The legislation which created the New England Board of Higher Education directs NEBHE to:

- Increase educational opportunities and services in New England
- Promote regional coordination and efficient use of educational resources among the six state governments and New England's public and independent higher-education institutions
- Analyze and publish regional information related to higher education
- Sponsor policy studies and forums on higher-education issues
- Explore and strengthen the connection between higher education and economic development in New England.

The planning phase of the Regional Project on the Global Economy and Higher Education in New England has received the support of concerned private-sector organizations, including: AT&T, Bank of Boston, Bank of New England, The Boston Company, Boston Globe, The Henley Group, and Peat Marwick Mitchell. Additional corporations will be asked to participate.

From the inception of the planning phase of the Regional Project, the Caucus of New England State Legislatures has provided support to several aspects of the program. The Caucus is the six-state association of House speakers, Senate presidents and majority and minority leaders of both houses.

A Note on the Future of Pease Air Force Base and New Hampshire's International Competitiveness

This New England Board of Higher Education assessment of international competitiveness in New Hampshire is fortunately timed. With the federal government's plan to close Pease Air Force Base near Portsmouth, New Hampshire has been presented a compelling opportunity to significantly bolster the state's role -- and indeed New England's role -- in the global marketplace. The state of New Hampshire deserves praise for its decision to make this internationally critical economic development project the subject of an important study.

The Pease site in Newington is strategically blessed with land for science park and manufacturing facilities, the international harbor facilities of nearby Portsmouth, railroad transport, uncluttered interstate highway systems, and proximity to the University of New Hampshire. The airport infrastructure at Pease includes runways that are long enough, strong enough and maintained well enough to meet the highest international standards. Pease presents coastal New Hampshire with the potential site of an internationally competitive center of American productivity.

Careful planning and innovative approaches will be needed to guide the transformation of the Pease site into a center for technology and international trade. In the tradition of New England, citizens will seek assurances that this metamorphosis is environmentally sound and that the end product is committed to being a good neighbor. In another New England tradition, New Hampshire and her neighbors will summon "Yankee ingenuity" to turn the usual economic hardship caused by the closing of a major U.S. government installation into bounty.

Meeting this challenge and others demands increased international awareness among all our citizens and globally savvy government and business leadership. Education's role in creating this atmosphere is the essence of the New England Board of Higher Education's Regional Project on the Global Economy and Higher Education in New England.

John C. Hoy
President
New England Board of Higher Education

PREFACE

The Regional Project on the Global Economy
and Higher Education in New England
by
John C. Hoy, President
New England Board of Higher Education

The call for "international economic competitiveness" has produced some of the most overworked rhetoric of the 1980s. Still, the problem is real for all New Englanders. At stake are jobs, income, economic growth and standard of living.

New England's response to the global economy must involve collaboration among government, business and higher education. These sectors must recognize a key premise: economic competitiveness requires educational effectiveness. As our products become more technological and our markets become more global, the need for literacy and basic skills increases. New England's workforce must have math and computer skills, as well as technological and international knowledge, at least equal to that of our major competitors.

NEW ECONOMIC REALITIES

In the past two decades, the United States has experienced a decline in productivity growth; periodic national and regional recessions; massive federal budget deficits and international trade deficits; and a decline in its share of worldwide gross national product.

New England, with its preeminence in technological innovation, has fared better than the nation as a whole over the past decade -- and economists in the United States and abroad have cited the region as a model of the nation's capacity to reindustrialize. However, New England's economy is no longer in the vibrant phases of growth. In addition, the U.S. trade deficit is an urgent problem for New England, as it is for the entire nation.

An estimated 30 percent of all U.S. goods now face international competition either at home or abroad. New England will sustain its recent success only by capitalizing on world markets -- many of which are just beginning to grow as U.S. markets mature.

Students, workers and consumers today have an economic imperative to become internationally aware. The export of innovative technological products and advanced professional services are among New England's and the nation's greatest growth fields. Yet, in 1986, exports represented only 5 percent of U.S. GNP, compared with 27 percent in West Germany, 24 percent in Canada, and 11 percent in Japan. Leaders of economic development agencies and trade associations in New England say a lack of international cultural awareness is a chief reason many U.S. businesses have not begun exporting.

EDUCATIONAL EFFECTIVENESS

New England's economic future depends on international savvy and global effectiveness. This know-how rests, in turn, on the effectiveness of higher education, and indeed, education at all levels. Broadly speaking, New England's 270 colleges and universities play two crucial roles in this regard. They offer the promise of generating a competent and internationally aware citizenry. And their research stimulates the entrepreneurial activity that makes New England a significant contributor to U.S. competitiveness in international markets.

Recognizing these crucial links, the New England Board of Higher Education (NEBHE) has initiated a study of the specific roles the region's colleges and universities must play in preparing citizens to be knowledgeable consumers and vital contributors to the global economy over the long term.

NEBHE has devoted more than two years of research to the Regional Project on the Global Economy and Higher Education in New England. The project aims to: upgrade education at all levels; heighten international awareness among all citizens; coordinate the international economic initiatives of business, higher education and government; develop more timely data on international issues; and foster technology transfer and technical assistance.

KEY ISSUES

In the course of its research, NEBHE has identified certain key issues that must be addressed if New England is to succeed in the global economy:

- **Education and Training.** Global economic competition adds to our demands for a well-educated workforce. But many signs indicate we are falling behind our economic competitors in literacy and basic education. Only about 70 percent of U.S. students finish high school, compared with Japan's 98 percent. Between 20 million and 30 million U.S. adults are considered functionally illiterate.

- **International Awareness.** Economic competitiveness requires international awareness. But foreign-language study in the United States has declined over the long term, and study-abroad and overseas internship programs are limited. While the international dimension has not been integrated into most business-school curricula, international studies in the liberal arts usually lack an economic perspective.

- **Business-Higher Education Coordination.** New England business leaders increasingly focus on international issues. But their approaches and goals are not coordinated with those of higher education, resulting in duplicated efforts, and depriving faculty, students and businesses of the benefits they could offer one another in terms of internships, continuing education and data-sharing.

- **Timely Data.** Throughout America, state and regional policymaking is hampered by a lack of timely U.S. data on state-by-state trade, as well as comparative information on educational achievement and other socio-economic characteristics pertinent to competitiveness. Little is known about the import side of the manufacturing trade equation at the state level, and even less is known about international aspects of the service sector. Students, teachers and corporate and government leaders have no central source to turn to for an overview.

- **Technology Transfer.** New England's research prowess is a major competitive asset. Transferring research-spawned knowledge to the world marketplace will be crucial to the nation's trade future and the careers of today's undergraduates. But technology transfer has not been adequate to transform research into economic gain. Students, businesses and policymakers do not have an effective network to help them apply new knowledge on a timely basis.

PROJECT COMPONENTS

The NEBHE Regional Project on the Global Economy and Higher Education in New England was established in early 1987. NEBHE research has focused primarily on what New England campuses are doing now and what they may do in the future to heighten international awareness and enhance the region's international competitiveness. A key consideration throughout this analysis has been how New England colleges and universities may share resources among themselves -- and with businesses, government and local school districts -- to meet the new challenges posed by global economic change.

To date, NEBHE has completed the following tasks in connection with the Regional Project:

The Future of New England Survey. In the spring of 1987, NEBHE's six-state Future of New England Survey asked New England governors, legislators, business executives, college presidents and governing board members to evaluate the effectiveness of colleges and universities in preparing the workforce for a global economy and suggest specific ways that educational effectiveness could be enhanced.

Only 32 percent of the business leaders said they believed colleges and universities were effective. Leaders ranked "design an undergraduate curriculum that ensures understanding of a global economy" as the most important step for colleges and universities in preparing New England's workforce for the global economy.

Case Study: International Initiatives at New England Campuses. NEBHE has conducted personal interviews with more than 200 internationally oriented scholars and administrators at 40 representative institutions of higher education (public and independent, two-year and four-year) throughout the region to evaluate campus initiatives for dealing with the increasingly global economy. This assessment is being expanded and updated in conjunction with legislative briefings in each New England state.

Case Study: Corporate Perspectives on International Knowledge and Economic Competitiveness. NEBHE has conducted personal interviews with approximately 50 corporate leaders and state trade office leaders to gain an in-depth view of the business world's perspective on higher education's role in an international economy. This assessment also is being expanded in conjunction with legislative briefings. The following major themes have emerged:

- **Because of an historical focus on domestic markets, the United States is adjusting too slowly to new global economic realties.**
- **If the United States is to increase export activity, businesses must have a broader base of international knowledge.**
- **Professionals who have the ability to conduct management, negotiation and marketing across cultures are increasingly valuable.**

Pilot Legislative Briefings. NEBHE has begun a pilot round of briefings for legislators in each New England state. The briefings are intended to update lawmakers on the new realities of the global economy and recommend ways for higher education to collaborate with business and government to meet the new challenges. State-specific background papers have been prepared and issued in conjunction with the briefings.

Project Advisory Council. NEBHE has created a Project Advisory Council, comprised of knowledgeable individuals from the six participating states, to offer input, direction and evaluation for the project. NEBHE plans to expand membership of the Council.

This background paper is intended to shed light on the initiatives currently in place in New Hampshire, to enhance competitiveness, and offer recommendations to improve the state's competitive position.

TABLE OF CONTENTS

Acknowledgements.....i
About NEBHE and the Regional Project.....ii
A Note on the Future of Pease Air Force Base.....iii
Preface.....iv

I. Introduction: The Global Economic Challenge.....1
The NEBHE Regional Project.....2

II. New Hampshire Economy in an International Context.....3
Foreign Investment in New Hampshire.....3
Manufactured Exports: Their Impact.....4
Dollar Value of Manufactured Exports.....5
Employment Related to Manufactured Exports.....10
New England Trade with Canada.....12
Potential Export Growth Among New England Small Businesses.....13
Findings and Summary Comments.....15

III. International Competitiveness: Programs in New Hampshire.....16
Federal Trade Resources.....16
The International Trade Administration.....17
Small Business Administration.....17
Regional Resources.....19
Small Business Association of New England.....19
Massport's Trade Development Unit.....20
International Business Center of New England.....20
Other Regional Programs.....21
State Level Strategies in New Hampshire.....21
Financial Incentives to Enhance Economic Development.....22
New Hampshire Division of Economic Development
Office of Industrial Development.....23
New Hampshire Industrial Development Authority.....24
New Hampshire Municipal Bond Bank.....24
New Hampshire Business Development Corporation.....25
Community Development Finance Company.....25
New Hampshire Job Training: Coordination of Vocational Technical Educational Resource.....25
New Hampshire Job Training Council.....26
Vocational Technical Education.....26
International Trade Initiatives.....27
Division of Economic Development, Office of Industrial Development.....28
New Hampshire State Port Authority.....28
SBDC and the International Trade Association.....29
Other State Initiatives: Teacher Education and the Legislature30
New Hampshire World Affairs Council.....31
Chambers of Commerce.....32
Two Key Programs for Consideration.....32
Finding and Summary Remarks.....33

IV. Higher Education and International Economic Competitiveness.....36
The Need for Higher Levels of Education and International Awareness and Expanded Research, Development and Technology Transfer.....36
Education in the Global Economy.....38
Literacy and Education in New Hampshire.....39
Science and Engineering Education: Fueling a Knowledge Intensive Economy.....40
New Hampshire Initiatives to Heighten Levels of Education.....41
The New Hampshire College and University Council.....43
Lack of International Awareness.....44
Campus-based International Initiatives.....44
Foreign Student Enrollment.....48
Business-Higher Education Lack Coordination.....49
Research and Development (R&D) Investment.....50
New Hampshire Share of Federal R&D.....51
R&D Expenditures at Colleges and Universities.....53
National Institutes of Health Funding.....54
Summary Remarks.....54
Technology Transfer and Technical Assistance.....55
Technology Transfer.....55
Technical Assistance.....57
Coordinating Efforts.....58

V. Recommendations.....60
Education and Training.....60
International Awareness.....61
R&D Investment, Technology Transfer and Technical Assistance.....62
International Trade Development.....64

Appendix
MA Global Education Centers Programs
BEST Program
Workforce 2000 Project
U.S.-Canada Free Trade Agreement: Trade Profile for New Hampshire

TABLES

TABLE 1: Foreign Employment in New England 1986.....
TABLE 2: Value of Top Ten Manufacturing Industries in New Hampshire 1984 and 1986.....
TABLE 3: Value of Manufactured Exports as Percent of Total Shipments, 1984 and 1986.....
TABLE 4: Value of Manufacturing Industry Exports in New England & U.S., 1984 and 1986.....
TABLE 5: Employment Related to Manufactured Exports in New England & U.S. 1984 and 1986.....
TABLE 6: New England State Trade with Canada: 1986 and 1987.....

FIGURES

Figure 1: Employment Related to Manufactured Exports: 1986.....

I. THE GLOBAL ECONOMIC CHALLENGE

The loss of international economic competitiveness experienced in the United States over the past two decades has been well-documented. The facts reveal a decline in productivity growth; periodic national and regional recessions; growth of federal budget deficits as well as international trade deficits; decline in the U.S. share of worldwide gross national product; decline in nondefense research and development (R&D) expenditures as a percent of U.S. GNP; the lagging test performance of U.S. students compared with those of other countries; the fall in the numbers of U.S. students pursuing doctorates in science and technical fields ... the list of factors goes on.

New England has fared better than the nation as a whole over the past decade and has been cited both nationally and internationally as the prime example of the nation's capacity to reindustrialize. The region has experienced advanced industrial development based upon preeminent scientific infrastructure and technological innovation. New England's unequaled higher-education infrastructure has been credited for its primary impact on the region's economic renewal.

Nonetheless, New England is now at a major crossroads. With an economy that is no longer in the vibrant phases of growth, how can the region sustain its recent success? More importantly, how can we meet the complex challenges of intense international economic competition?

The economies that will meet this challenge are those capable of fostering a resourceful and flexible workforce that can utilize swiftly changing advanced technologies in an efficient and effective manner. Indeed, a well-educated workforce has been New England's primary advantage, and must become even more so as the economy becomes more international.

It has become clear that state initiatives on behalf of international competitiveness are required. This is a new role for the states. The territory is not well charted.

The NEBHE Regional Project

The New England Board of Higher Education's Regional Project on the Global Economy and Higher Education was established in early 1987.

The project is based on the following underlying premises:

- Competition on a global basis is a far more complex and demanding challenge than competition at home;
- As New England's economy becomes increasingly knowledge-intensive and dependent upon emerging advanced technologies and sophisticated services, the region also becomes more dependent upon the development of skilled human capital. This is one reason that institutions of higher education will become key players in state and regional initiatives to meet global economic challenges;
- Basic skills of U.S. entry-level employees are often not of as high a quality as basic skills of entry-level employees in other developed nations. Through attention to curriculum, higher education can foster long-term strategies to help the region address this issue, and enhance our competitiveness in an international context;
- The world economy, not the domestic economy, will grow significantly over the next several decades. New England's state and regional economies must be nurtured so they are well-positioned to take advantage of available worldwide markets;
- To be competitive in the global marketplace, policymakers must understand the strengths of each state's economy in an international context, as well as in an interstate and national context.

What follows is a summary of the issues as they pertain generally to the region and more specifically to the state of New Hampshire.

II. NEW HAMPSHIRE ECONOMY IN AN INTERNATIONAL CONTEXT

Foreign Investment in New Hampshire

In the last year, the level of foreign investment in the United States has sparked concern. But studies by regional and national economists suggest that to date, the impact is relatively small both in New England and in the nation. What foreign investment has occurred has been beneficial to New England in the long term in that it has introduced diversity to local economies. As global trade increases, foreign investment in the United States and by U.S. companies in other nations is very likely to continue increasing.

As a percentage of non-farm employment, employment by foreign-owned companies in New Hampshire is higher than the regional average and second only to that of Maine (see Table 1). The influence of foreign affiliates in New Hampshire, by most other measures is of little significance compared with such influence in other states. In 1985, New Hampshire ranked 43th nationally in the total number of foreign affiliates with property, plant and equipment, and 45th in the gross book value of their property. Also in 1985, however, New Hampshire did rank higher nationally in acres of land owned by foreign affiliates, at 27th. Only in terms of employment by foreign affiliates per 1,000 population did New Hampshire rank among the top ten states. At 16.5 percent, New Hampshire ranked 10th in the nation in this capacity.

TABLE 1
Foreign Employment in New England: 1986
(numbers in thousands)

	Non-farm Employment* (1)	Employment in Foreign Companies+ (2)	Percent in Foreign-Owned Companies**
CT	1,267.0	50.7	4.0%
ME	367.0	21.7	5.9%
MA	2,390.0	75.7	3.2%
NH	399.0	16.7	4.2%
RI	359.0	11.2	3.1%
VT	185.0	7.0	3.8%
NE	4,965.0	184.1	3.7%

*The government and financial sectors were removed from total non-farm employment for compatability purposes with non-bank company affiliates' data.
+U.S. Department of Commerce data for non-bank foreign company affiliates

**Figures in Column (2) as percent of those in Column (1)

Note: Figures may not add up to totals due to rounding

Source: Wentrup, Hans J., "Foreign Ownership Has Only Mild Impact," New England Business, December 1988; and U.S. Department of Commerce, Statistical Abstract of the United States, 1988.

Manufactured Exports: Their Impact

The United States experienced flat growth in exports from 1981 through 1986, while imports grew at approximately 7.5 percent per year. The nation saw modest improvement in exports, beginning in early 1987. By mid-1987, American exports were surging and continued to do so throughout 1988. Although continued strength in imports has prevented significant improvement to the trade balance, the U.S. trade deficit by September 1988, shrank to its lowest level in three years. By the end of the first quarter of 1989, the trade deficit was reduced by almost 10 percent, and by August, the 1989 cumulative reduction over August of 1988 was 7 percent.

The current export boom has been attributed, in part, to a weakened U.S. dollar, yet many economists note other important factors, such as:

- Continued vitality in service exports (the trade balance for the service sector was in the black even when overall deficits were at record highs, but projections for 1988 suggest the service sector has lost strength);
- A new emphasis by the nation's exporters on making quality products and developing leading-edge technology;
- The return home of some manufacturing across the United States that had been shifted to nations with lower labor costs;
- The relative strength of foreign economies, particularly Japan's and Europe's, that are able to absorb U.S. exports both now and in the forseeable future.

Still, exporting has not come naturally to U.S. companies. In 1987, exports represented only 5.4 percent of U.S. GNP, compared with 26 percent of West Germany's GNP, 25 percent of Canada's, and 10.5 percent of Japan's.

The United States has long been considered the world's richest market. As a result, U.S. businesses have established a narrow frame of reference that generally ends at the Atlantic and Pacific oceans; U.S. businesses are relatively ignorant of foreign cultures, languages and markets. The global economy demands that we heighten our international awareness.

Dollar Value of Manufactured Exports

New England's manufactured exports totaled $20.9 billion in 1986, 15.5 percent more than in 1984. The region's largest exporting industries included non-electrical machinery, electronics, transportation equipment, scientific instruments and fabricated metals. These five industries accounted for approximately 71 percent of the value of the region's manufactured exports.

Exports of non-electrical machinery, the region's largest industry, totaled $5.5 billion in 1986, almost 20 percent above the 1984 level. Twelve percent of the dollar value of the nation's total exports by this industry

were made in New England.

The region's exports of electronic equipment were valued at $4.1 billion, approximately 32 percent above the 1984 level. This industry accounted for 9.6 percent of the electronics industry's total dollar exports nationwide.

Scientific instruments exported from New England ranked fourth in total dollar value in 1984. However, the value of New England's scientific instrument exports represent almost 15 percent of the value of all scientific instruments exported from the United States.

New Hampshire's manufactured exports totaled $1,661.7 million in 1986, a substantial increase over its 1984 level. With an increase of 47 percent more than in 1984, New Hampshire leads the region in this capacity and is well above the regional and national averages of 15 and 10 percent, respectively. New Hampshire's five leading export industries in dollar value were: non-electrical machinery, electronics, paper products, scientific instruments and rubber products. These five industries accounted for approximately 54 percent of the value of all New Hampshire's manufactured exports (see Table 2 below).

TABLE 2
Value of Top Ten Manufacturing Industries in New Hampshire: 1984 and 1986
(in millions of dollars)

INDUSTRY	1986 VALUE	1984 VALUE
Non-Electrical Machinery	734.4	438.9
Electronics and Electrical Machinery	336.3	224.7
Paper and Allied Products	134.3	90.9
Scientific Instruments	112.4	82.9
Rubber and Misc. Plastic Products	93.5	51.2
Primary Metals	61.0	47.3
Fabricated Metals	45.6	49.8
Chemicals & Allied Products	28.4	23.1
Textile Mill Products	27.9	34.7
Lumber & Wood Products	22.3	22.8

*Industries are listed in highest to lowest in order of the 1986 dollar value.

Source: U.S. Bureau of the Census, Annual Survey of Manufactures, Origin of Exports of Manufactured Products, 1984 and 1986, Table 5a.

In real dollars, New Hampshire's largest export industry is non-electrical machinery. This industry also ranks first in terms of what share of total production was exported. By this latter measure, chemicals and allied products, electronics, primary metals and scientific instruments rank second through fifth. Exports accounted for almost 31 percent of the value of chemical products, 24 percent of the value of electronics and of primary metals, and slightly more than 21 percent of all scientific instruments that were manufactured in New Hampshire (see Table 3).

Whereas 13 percent of manufactured products made in New Hampshire were exported in 1984, almost 18 percent were in 1986. New Hampshire's 18 percent figure ranks a close second in the region to Vermont where 20 percent of manufactured products were exported.

At the industry level there was significant growth in the value of both non-electrical machinery and electronic exports, with 67 percent and 50 percent increases, respectively, from 1984 to 1986.

Also impressive in New Hampshire was the across-the-board growth of exports between 1984 and 1986. New Hampshire's growth from 1984 to 1986 was substantial in almost all major industries. Of the top 10 industries that export, only lumber and wood showed a decline.

TABLE 3
The Value of Manufactured Exports
as a Percentage of Total Shipments by Industry:
New Hampshire & the U.S.: 1984 and 1986

Industry+	1986 NH	1986 U.S.	1984 NH	1984 U.S.
Non-Electrical Machinery	30.6	22.8	20.8	21.5
Chemical and Allied Products	27.6	17.4	23.3	16.6
Electronics	23.8	21.3	17.8	18.2
Primary Metals	23.7	23.3	19.5	19.5
Scientific Instruments	21.1	16.5	15.5	15.4
Paper & Allied Products	15.3	12.0	10.2	10.6
Rubber & Misc. Plastic Products	13.6	13.0	9.7	11.7
Textile Mill Products	11.4	8.2	13.9	7.4
Fabricated Metals	10.6	12.9	11.9	11.6
Miscellaneous Manufacturing	6.2	8.2	4.4	7.4
Leather & Leather Products	5.7	8.8	4.8	6.8
Lumber & Wood Products	5.6	8.8	6.0	8.3
Stone, Clay and Glass Products	4.6	7.3	5.4	7.2
Printing & Publishing	4.0	4.3	3.3	4.2
Apparel & Other Textile Products	2.2	3.6	2.2	3.0
Transportation Equipment	2.0	13.6	3.9	12.8
Furniture & Other Fixtures	1.6	2.8	1.3	2.7
Food & Kindred Products	1.5	5.0	1.4	4.8
Tobacco Products	0.0	12.1	0.0	14.6
Petroleum & Coal Products	0.0	9.1	0.0	7.8
All Industries	17.6	13.0	12.9	11.9

+Industries are listed in order of size (exports as percentage of total industry) in the state of New Hampshire.

Note: Includes employment in the manufacture of goods that become components of other goods that are exported.

Source: U.S. Bureau of the Census, Annual Survey of Manufactures, Origin of Exports of Manufactured Products, 1984 and 1986, Tables 4a and 5a.

In 1986 almost 4 percent of the value of New England's exported manufactured goods and .6 percent of the nation's are made in New Hampshire. The Granite State's exports grew from 6 to 8 percent of the value of all exports shipped from New England from 1984 to 1986 (see Table 4 below).

TABLE 4

VALUE OF MANUFACTURING INDUSTRIES EXPORTS IN NEW ENGLAND AND THE U.S.: 1984 and 1986

	1984				1986			
	Value of Exports ($'s in millions)	Exports as % of Total Shipments	Share of N.E. Exports (in %)	Share of U.S. Exports (in %)	Value of Exports ($'s in millions)	Exports as % of Total Shipments	Share of N.E. Exports (in %)	Share of U.S. Exports (in %)
CT	5,435.5	15.6	30.0	2.0	6,186.0	17.2	29.6	2.1
ME	1,215.0	12.2	6.7	.5	1,393.0	13.8	6.7	.5
MA	8,767.6	15.0	48.4	3.3	9,724.7	15.9	46.6	3.3
NH	1,126.8	12.9	6.2	.4	1,661.7	17.6	8.0	.6
RI	946.4	11.1	5.2	.4	1,068.9	12.7	5.1	.4
VT	617.2	16.2	3.4	.2	833.9	20.1	4.0	.3
NE	18,110.5	14.5	100.0	6.8	20,868.2	16.2	100.0	7.1
US	268,278.0	11.9		100.0	294,339.5	13.0		

Note: Figures may not add up due to rounding.

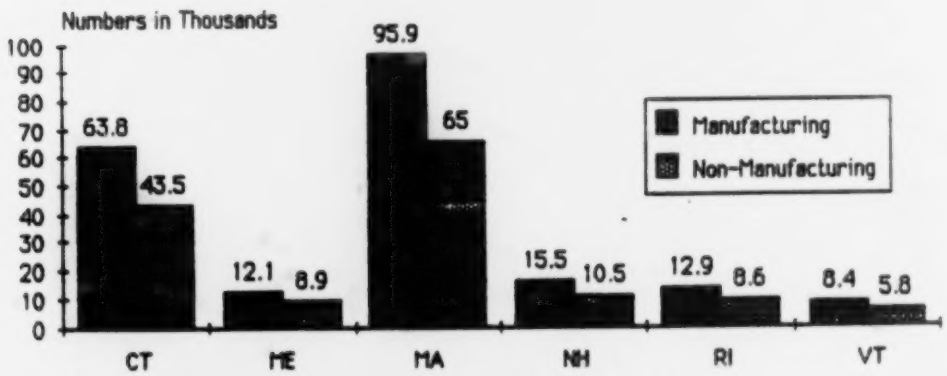
Source: U.S. Bureau of the Census, Annual Survey of Manufactures, Origin of Exports of Manufactured Products, 1984 and 1986, Tables 4a and 5a.

Employment Related to Manufactured Exports

Throughout New England, export-related industries accounted for more than 350,900 jobs in 1986, 12.5 percent more than in 1984. Approximately 208,600 of these jobs were in manufacturing industries, which directly produced the exports, while 142,300 were export-related jobs in industries including transportation, communications, agriculture and business services (these same industries also export directly). Although New England is home to only 5 percent of the nation's population, it accounts for almost 8 percent of U.S. export-related employment. In addition, New Englanders hold 9 percent of all U.S. export-related manufacturing jobs (See Figure 1). Four of the six New England states rank among the top 10 nationally in export-related employment as a percentage of total civilian employment. New Hampshire ranked 7th in 1986, showing a steady improvement from its 1980 ranking of 13th (see Table 5).

FIGURE 1

Employment Related to Manufactured Exports: 1986



Note: Includes employment in the manufacture of goods and services that are components of other goods that are exported.

Source: U.S. Bureau of the Census, Annual Survey of Manufactures, Origin of Exports of Manufactured Products, 1986, Table 2a.

In 1986, approximately 26,000 New Hampshire jobs were related to manufactured exports. New Hampshire industries accounted for over 7 percent of New England's export employment, while New England accounted for almost 8 percent of the nation's in 1986.

Table 5

Employment Related to Manufactured Exports in New England and the United States: 1980, 1984 and 1986

Area	Export-Related Employment* In Thousands			As Percent of Total Civilian Employment			Rank Among 50 States in Order of Size of*		
	1980	1984	1986	1980	1984	1986	1980	1984	1986
Connecticut	105.8	96.9	107.3	6.7	6.0	6.5	1	1	1
Maine	19.5	18.8	21.0	4.2	3.6	4.0	28	22	22
Massachusetts	151.4	144.9	160.9	5.5	5.0	5.5	11	3	2
New Hampshire	23.0	21.6	26.0	5.4	4.5	5.2	13	8	7
Rhode Island	25.4	19.1	21.5	5.9	4.3	4.5	5	11	13
Vermont	11.2	11.1	14.2	4.7	4.4	5.1	20	9	8
New England	336.3	312.6	350.9	5.5	5.0	5.5			
United States	4,808.3	4,096.7	4,576.6	4.8	3.8	4.1			

*Includes employment in the manufacture of goods and services that become components of other goods that are exported.

*Rank order is of export-related employment as percent of total civilian employment.

Source: U.S. Bureau of the Census, Annual Survey of Manufactures, Origin of Exports of Manufactured Products, 1984, Table 2a, and 1981, Table 2b.

New England Trade With Canada

State and regional policymaking is hampered by a lack of timely U.S. data on imports and exports. Although U.S. Bureau of the Census data provide descriptive information about state-level employment in export industries and the value of those industries' products, the data is old, and little is known about the current scenario. In addition, little is known about the import side of the trade equation at the state level.

The Canadian Government, however, provides data on import/export trade among all the Canadian provinces and U.S. states within approximately four months of the close of each calendar year.

The Canadian Consulate located in Boston provided 1987 figures for the following analysis. Table 6 below shows that 1987 exports from New Hampshire to Canada increased by 12 percent over 1986, while Canadian exports increased by 17 percent, causing a 25-percent increase in New Hampshire's trade deficit. Total trade between New Hampshire and Canada consisted of 37 percent of shipments to Canada in 1986 and 36 percent in 1987.

TABLE 6

New England State Trade with Canada: 1986 and 1987
(in millions of U.S. dollars)

	1986			1987			1987 over 1986 % Increase in Exports to Canada
	Imports from Canada	Exports to Canada	Trade Balance	Imports from Canada	Exports to Canada	Trade Balance	
CT	850.4	830.7	-19.7	829.1	823.7	-5.4	-.8%
ME	766.4	256.8	-509.8	995.3	262.8	-732.5	2.4%
MA	2,358.6	1,462.8	-895.8	2,706.4	1,773.9	-932.5	21.3%
NH	310.9	126.4	-124.6	363.9	207.8	-156.1	11.5%
RI	465.0	128.4	-336.6	244.6	139.0	-105.6	8.3%
VT	802.0	190.4	-611.6	1,034.2	367.8	-666.4	93.2%
NE	5,553.3	3,055.2	-2,498.1	6,173.4	3,574.9	-2598.5	17.0%

Note: figures may not add up due to rounding

Source: Statistics Canada, "Domestic Exports/Imports to/from the United States, January to December 1987 (provided by the Canadian Consulate, Boston, MA); New England Council, "The U.S.-Canada Free Trade Agreement: A Study of the Costs and Benefits to New England," March, 1988 (used the same data for 1986 provided by the Canadian Consulate.

A 1986 comprehensive trade profile for New Hampshire and Canada was prepared by the Northeast-Midwest Institute and published by the New England Council (see Appendix).

The New England Council report suggests the U.S.-Canada Free Trade Agreement will benefit New England overall, and that New Hampshire specifically has much to gain, particularly due to the fact that most of its exports are finished products that faced the highest tariffs, now eliminated by the agreement for more competitive product pricing. The computer industry, one of New Hampshire's top employers, should benefit from the elimination of export tariffs, as could hard-hit industrial machinery producers that have been staging a recovery from hard times. The lumber, steel and wood pulp industries dependent upon Canada for supplies of raw materials should also benefit from the assurance of lower costs for these materials.

Because the U.S. export boom started in mid-1987 and has continued at least through the first quarter of 1989, the Canadian data to be released in 1989 should prove most interesting. NEBHE staff will analyze this 1988 data and incorporate it into briefing materials for New England state legislative leaders at a later date.

Important changes also are underway overseas. The integration of the Common Market economies of Western Europe into a single continental economy in 1992 could provide new advantages for American businesses selling products in Europe, if they begin preparing now. Likewise, the opening up of Eastern European economics could also provide new advantages in the years to come.

Potential Export Growth Among New England Small Businesses

Over the past 10 years, small businesses have been viewed as a key source of the nation's innovation and jobs. New England is unique among U.S. regions in that its economy is dominated by many small advanced-technology companies

rather than large corporations. Data recently released by the U.S. Small Business Administration (SBA) show that small and medium-sized businesses make up approximately 96 percent of all businesses in New Hampshire and 97 percent in New England. It may be New England's small businesses that provide the greatest potential for growth in regional exports.

Employment in New England small businesses increased 25 percent from 1976 to 1984; and small businesses provided 50 percent of all jobs in the region from 1982 to 1986.

However, the SBA estimates that 11,000 small businesses in the nation's leading export industries have the capacity to export, but are not yet actively doing so.

Indeed, small businesses face special challenges as exporters. Companies with fewer than 20 employees often find exporting virtually impossible, in part because they lack professional expertise in overseas markets. Obstacles include: foreign languages, time zones, taxes, regulations, international licenses and patent considerations, tariffs, customs inspection, laws, transportation and distribution systems, and varying cultural business practices.

Likewise, small businesses often lack the capital to sustain export operations through periods when the U.S. dollar's value is high relative to the currency of the importing nation. Although small businesses have lower levels of working capital than large corporations, they incur high overhead costs when beginning an endeavor. To make matters worse, export financing is very difficult to obtain, particularly for first-timers. Small businesses are often viewed as greater risks for financing.

Nonetheless, New England small businesses do dominate the advanced-technological industries that hold the greatest potential for export trade expansion and overall economic development. It behooves the region to nurture these companies.

Finding and Summary Comments

A review of the New Hampshire and New England economies in an international context suggests great promise, as well as certain key considerations for meeting the challenge of international economic competitiveness.

- U.S. citizens, in general, suffer from international myopia, and most lack a basic understanding of international issues.
- Although both New England and the state of New Hampshire hold their own in the U.S. international trade arena, the degree of involvement is still small. Only 5.2 percent of New Hampshire's and 5.5 percent of New England's civilian employment was export-related in 1986. Strategies must be designed to nurture industrial expansion in an international context.
- U.S. data regarding the international economic position of the states and their industries is terribly outdated at the time of its release. Steps should be taken to generate better data on a more timely basis to aid state and regional policymakers in developing the international dimensions of their economies.
- At the regional and state levels, a large number of small businesses are a dominant economic force, and these small businesses have certain competitive features that make them well-suited for international trade. But many of these small companies have not begun exporting. They may depend on other organizations for counseling, training, data analysis and market research, financial assistance, opportunities to attend trade shows and other services. A wide variety of such services exist. But the higher-education community, government and trade-related organizations must work together to further strengthen these businesses as they approach the international arena.

III. INTERNATIONAL COMPETITIVENESS: STATE PROGRAMS IN NEW HAMPSHIRE

Governments, businesses, trade associations and higher education have devised national, regional, state and local initiatives to enhance international economic competitiveness. Although the programs vary widely, they generally aim to bolster economic development so that an overall competitive advantage can be achieved and sustained, or they specifically promote international trade.

FEDERAL TRADE RESOURCES

On the federal level, international trade programs are sponsored by: the Agency for International Development, the departments of Agriculture, Commerce, State and Education, the Export-Import Bank, the Overseas Private Investment Corporation, the SBA, the Trade and Development Program and the Office of the U.S. Trade Representative.

A recent publication of the Small Business Administration (SBA) is a must for all state and regional organizations as well as institutions of higher education that provide international trade counseling or technical assistance. The SBA's Exporter's Guide to Federal Resources for Small Business (1988) outlines the multitude of federal programs designed to provide financial and/or technical support to U.S. companies seeking entry into or expansion in international markets. It is an excellent resource for New Hampshire's small and medium-sized companies and for those advising them on the export process.

Two federal agencies involved in international trade deserve special attention. They are the Department of Commerce's International Trade Administration and the SBA.

The International Trade Administration (ITA)

ITA, established in 1980 to promote world trade, is the official U.S. government organization coordinating all issues concerning trade development, international economic policy and programs in the area of international commerce and import administration.

Two of ITA's four offices are charged with increasing export awareness and stimulating the export of goods and services. These offices provide individual export counseling, sponsor trade missions and fairs, develop catalog and video catalog exhibitions, provide electronic information for foreign sales leads, and conduct conferences and seminars to help companies enter new markets.

Through ITA, 2,800 companies participated last year in 142 overseas trade fairs and missions, reaching almost five million prospective buyers, agents and distributors. Projects are generally coordinated with local offices of the SBA, state agencies and area trade associations. ITA has 48 offices in the United States, as well as posts in more than 120 foreign countries.

The ITA office serving New Hampshire is located in Boston. The Boston office also serves Maine, Massachusetts and Vermont.

ITA's biweekly publication, called Business America, is a useful tool for state and local leaders involved in international trade development as well as for current and future exporters.

Small Business Administration (SBA) Resources in New Hampshire

The SBA offers a multitude of services for the small-business person, as well as for individuals contemplating the creation of a small-business enterprise. Many SBA services are delivered locally through coordination with colleges and universities. While some SBA services are designed to assist small businesses with management in general, others are specifically geared

toward providing international trade assistance, both financial and technical.

The SBA's Small Business Institutes (SBIs) offer free guidance and assistance to small businesses. The SBIs are staffed by college seniors and graduate business administration students (for academic credit) and their faculty advisors under SBA guidance. SBIs are located at Keene State College, New Hampshire College, Plymouth State College, Rivier College, and the University of New Hampshire.

The SBA's Small Business Development Centers (SBDCs) draw upon federal, state and local government resources, as well as the private sector and universities, to provide small businesses with management, technical assistance, counseling and practical training. SBDCs in New Hampshire are coordinated by the University of New Hampshire at Manchester. SBDC satellite offices include the Seacoast Regional Center at University of New Hampshire (UNH) in Durham and centers at Keene State College and Plymouth State College.

The International Trade Counseling and Training Program is the SBA program most specifically related to international trade. Established in the 1970s, this program provides one-time free legal advice for small and medium-sized companies that are new to exporting, as well as counseling and financial assistance for managers of small businesses that are considering entering international markets or expanding current export operations. Much of this activity is managed by the SBA's Business Development staff and coordinated with the Department of Commerce's International Trade Administration.

State SBA offices across the nation can provide access for small businesses to a computerized export/import information service through the University of Georgia. Through this system, known as Export Information Service (XIS), data reports are available for over 2,700 product categories. A small-business person can obtain a list of the 25 largest importing markets

for a particular product, the 10 best markets for U.S. exporters of that product and the major sources of foreign competition. Reports also identify the major products being imported by selected countries. New Hampshire small businesses do not yet have access to this service through the SBA state headquarters.

REGIONAL RESOURCES

Certain regional organizations are involved in promoting international trade by New England businesses. They include the Small Business Association of New England, Massport's Trade Development Unit and the International Business Center of New England. Though these organizations are regional in scope, they are all located in the Greater Boston Area, and Boston-area businesses benefit the most from their services.

Small Business Association of New England (SBANE)

SBANE, a member organization for small businesses in the region maintains an international trade committee, called SINTRAC, which meets monthly to discuss problems and issues pertinent to exporting. This committee's 36 members are drawn from small businesses that are already exporting, as well as representatives of the U. S. Department of Commerce, SBA and appropriate state offices throughout New England. SINTRAC members also include representatives of a small number of business organizations serving the international trade community.

SINTRAC projects include training programs in export administration (co-sponsored with the International Business Center of New England), and export dialogue programs involving chief executive officers who are experienced in foreign trade and willing to share their experience in marketing and distribution, and shed light on their relationships with

bankers, agents, brokers and freight forwarders. In 1989, SBANE's annual New England Business Conference, for the first time, included an international trade component, with general sessions on international trade, selling products overseas, financing international business, developing international joint ventures, the U.S.-Canada Free Trade Agreement and the European Community in 1992. The international component is likely to become a permanent part of SBANE's annual meetings.

Massport's Trade Development Unit

For more than a decade, the Trade Development Unit of Massport has provided referrals, research, marketing assistance and general guidance to small and medium-sized New England manufacturers seeking to begin exporting or expand current export operations. Each year, Massport assists more than 100 businesses through market research and analysis of products and countries. Massport also sponsors trade shows, trade missions and business meetings, and provides general information on international business and export opportunities. In addition, for companies doing market research, Massport operates an international business library located at the World Trade Center in Boston. While the majority of Massport's clients are based in Massachusetts, 10 percent to 25 percent are drawn from the remaining five New England states. Massport maintains international trade offices in London and Tokyo.

International Business Center of New England

The International Business Center of New England, established in 1956, sponsors seminars and programs for businesses interested in international trade. The center coordinates its efforts with other regional organizations, as well as those serving the Greater Boston area.

Other Regional Programs

Several other regional organizations have provided policy studies and data analysis; others have coordinated workshops, seminars and meetings related to the issue of international economic competitiveness. These organizations include the New England Board of Higher Education, the New England Caucus of State Legislatures, the New England Council and the New England Governors' Conference.

STATE-LEVEL STRATEGIES IN NEW HAMPSHIRE

Since the early 1980s when state government accumulated a substantial budget deficit, New Hampshire has achieved economic growth and a balanced budget that have been the envy of many states. At various points during the 1980s, New Hampshire has posted numerous achievements that serve as indicators of its strong economy:

- First in the nation in growth of wholesale and retail trade jobs, nonagricultural jobs, nonmanufacturing jobs and first in the ratio of high-tech employment to total employment.
- First nationally in personal-income growth.
- Lowest unemployment rates in the nation.
- According to figures provided by Massport's Trade Development Unit, New Hampshire was the only New England state with a trade surplus in 1987.
- Two New Hampshire cities were cited in Inc. Magazine's annual ranking of the fastest-growing cities in America. The Manchester-Nashua area ranked first, up from second in 1988, and Portsmouth ranked ninth, up from 13th in 1988.
- Third nationally in 1989 among high-intensity manufacturing states, down from first place in 1988, according to the annual Grant Thornton Report on Manufacturing Climates.
- An "A" for its business vitality on the Corporation for Enterprise Development's 1989 Development Report Card for the states.

The 1980s has indeed been a decade of development for New Hampshire.

Financial Incentives to Enhance Economic Development

Several evaluations of New Hampshire as a state with an excellent climate for business growth are based upon state government's fiscal policies. New Hampshire residents bear the lowest tax burden in the nation, while businesses also say they benefit from low tax levels. This has allowed New Hampshire to attract existing businesses from the Greater Boston Area of Massachusetts and start-up firms that might have been established in the Boston area if the tax burden had been less. The high levels of economic growth occurring in southern New Hampshire have resulted from the fact that this area has evolved as a satellite of the high-tech development in Massachusetts. Southern New Hampshire entrepreneurs can benefit from their proximity to Boston, remaining part of an important critical mass, while also benefiting from the lower costs of doing business, lower costs of living and high quality of life in New Hampshire. New Hampshire levies no general sales or user taxes at either the manufacturing or retail sales level, no personal income or payroll tax and no inventory tax.

Real and personal property taxes are collected at the local level only. The state receives its revenues from taxes on motor fuels, tobacco products, alcoholic beverages sold through the State Liquor Commission and parimutuel betting. The business profits tax that is levied by the state is enhanced by a surtax that is imposed on the taxable profits earned by businesses headquartered out-of-state and apportioned to New Hampshire.

New Hampshire does not offer many of the new tax incentives or credits that have been implemented by other states in recent years to attract new businesses, such as job-creation credits, industrial investment credits, tax credits to locate in specific zones or incentives for R&D investment.

New Hampshire's unemployment insurance tax rates are the lowest in New England. State tax as a percentage of per-capita income is at least three percent lower than that of all other New England states. Factoring in local taxes, New Hampshire's tax burden is still 2.5 percent less than those of the other five New England states. Government policymakers have relied upon low tax levels to attract business to New Hampshire and the strategy has worked effectively. This does, of course, considerably affect the state's ability to provide services.

New Hampshire Division of Economic Development (DED)

DED is the state government agency charged with promoting New Hampshire's environment for business and tourism. Within DED, the **Office of Vacation Travel** produces maps and pamphlets and a variety of other services by working closely with private industry. This office also manages a Matching Grant Program that assists local communities to develop more sophisticated advertising programs. Its publicity programs include a cooperative program with the other New England states. Another DED office, the **Office of Industrial Development** is charged with promoting existing businesses and attracting new business to New Hampshire.

Office of Industrial Development (OID)

OID provides services and publications designed to support and promote existing industry and to assist new or out-of-state firms interested in locating in New Hampshire. OID provides current information on labor markets, local economic and demographic trends, advertising programs, services for state industries exploring domestic and international markets, market-demand studies in cooperation with the University of New Hampshire, information on state and local regulatory requirements, referrals to other resources for

support services, financial counseling and a computerized data base that inventories all communities and industrial properties, known as the New Hampshire Economic Development Data System (NEDDS). Through NEDDS, companies wishing to expand or relocate and communities needing better information for development purposes can get timely data on available buildings, sites, industrial parks and community profiles (as well as profiles of surrounding communities) searched by several indicators.

OID maintains other active databases, including an annual profile for manufacturers and exporters, an annual occupational employment profile with supply and demand components and an annual wage and benefit profile. OID enhances its delivery of services through cooperative working relationships with business associations, other state government departments, local governments and education/training providers. OID publications include a directory of New Hampshire businesses, several business and development guides and a quarterly newsletter on economic development.

Industrial Development Authority (IDA)

IDA was created in 1955 to promote development of additional industrial and recreational facilities. The IDA provides financial assistance to companies and local development corporations seeking to build or expand industrial or recreational facilities in the state. Management of the IDA is vested in nine directors knowledgeable in finance and industrial operations.

New Hampshire Municipal Bond Bank (MBB)

The MBB issues bonds and notes to make funds available at low rates and favorable terms to state municipalities.

The New Hampshire Business Development Corporation (BDC)

BDC is a private corporation, though authorized and recognized by the Legislature as a state development-financing vehicle. Through its stockholders and participating state financial institutions, BDC provides additional financing to all types of new and existing New Hampshire businesses, establishing a medium of credit not otherwise available to them.

Community Development Finance Company (CDFC)

CDFC is a for-profit corporation that serves as a private, statewide financing vehicle for equity debt injections into real estate and business development ventures and employee-owned cooperatives.

New Hampshire Job Training: Coordination of Vocational/Technical Education Resources

Like the provision of other economic development services, New Hampshire relies upon a coordinated effort on the parts of various sectors to provide training programs for business and industry.

The New Hampshire Job Training Council and the System of Vocational/Technical Education are the major providers. These two systems, however, are directed by the State Occupational Information Coordinating Committee, a State Council for Vocational/Technical Education and the Department of Postsecondary Technical Education. They also work with the state department of secondary technical edcuation as well as the secondary vocational centers across the state.

The various vocational/technical training service providers have recently joined forces to assess ways they can coordinate efforts to effectively meet the needs of business and industry, and of state and local economic development groups. One product of their coordinated efforts is an impressive

resource guide, the Directory of Job Training and Vocational/Technical Education for Business and Industry, listing all public job-training resources available in New Hampshire, as well as state agencies and organizations concerned with job training, vocational/technical education and economic development.

New Hampshire Job Training Council (JTC)

The JTC serves as the Private Industry Council (PIC) responsible for administering the federal Job Training Partnership Act (JTPA) in New Hampshire. Until this year, there were two councils, one serving Hillsborough County and the other located in Concord and serving all other parts of the state. Now one council in Concord coordinates statewide programs.

Training programs fall into eight broad categories: classroom training offered at local schools, colleges or other sites geared to a broad range of occupations and career options; industry-specific training designed to meet company operational needs; on-the-job training for small numbers of employees to meet a company's immediate needs; tuition assistance generally up to a maximum of one year to help individuals qualify for a desired available job; a family independence program to help long-term welfare recipients learn skills that will lead to financial independence; dislocated workers' retraining programs; an "Over 55 Workers" training program that leads to part-time, share-time or full-time jobs; and youth programs for in-school and out-of school programs as well as training for the Governor's Summer Jobs for Youth Program.

Vocational Technical Education

Vocational-Technical Education is provided by a four-level system that includes: vocational/technical centers; a system of six post secondary

technical colleges and one institute; state colleges and University of New Hampshire (UNH) departments that offer associate's degrees in a small number of technical fields; and community-based training institutions.

As the major postsecondary vocational/technical program provider, the seven institution System (the six technical colleges and one institute) graduated 941 students in 1988. Of this graduating class, 79 percent went directly into full-time employment, 3 percent into part-time employment, and 12 percent continued their education, according to the Department of Postsecondary Vocational Technical Education (DPVTE). DPVTE also tracks employment of its graduates by college and occupational programs. The colleges and institute are strategically located throughout the state to meet the needs of seven major geographic regions of New Hampshire.

INTERNATIONAL TRADE INITIATIVES

New Hampshire has made steady progress toward improving its export trade position. Ranked 13th among the 50 states in 1980 in terms of employment related to manufactured exports as a percent of civilian employment, the state moved to 7th in 1986. Further, New Hampshire enjoyed a sharp increase in the dollar value of its exports between 1984 and 1986, most likely the result of tremendous economic growth domestically, moving to a next-stage of expansion internationally. The devaluation of the dollar, which benefited many high-intensity manufacturing states across the nation, also played a role. Little has been done, however, to enhance export trade. Moreover, what is now being done remains small relative to the initiatives of other New England states. As the dollar's value rises, it may be important for New Hampshire leaders to explore new ways to continue expansion of export trade.

Division of Economic Development: Office of Industrial Development (OID)

With a small budget dedicated to international trade development, OID staff work closely within a network of international trade organizations and serve as the state coordinators of international trade programs and resources. OID publishes several resources for international trade development. They include A Guide to Doing Business in New Hampshire, New Hampshire Offers to Industry International and Made in New Hampshire, a directory of New Hampshire companies. OID's "Journal of Economic Development," a quarterly newsletter, highlights trade show and export trade seminar announcements, and world trade expositions. These programs are generally managed by the U.S. Department of Commerce's Office of International Trade, the New Hampshire World Trade Association or the International Business Center, but co-sponsored with OID, the SBA, and the New Hampshire Port Authority. OID also sponsors international delegation visits to New Hampshire and represents state businesses at trade shows.

New Hampshire State Port Authority (NHPA)

NHPA is responsibile for port promotion, traffic management and trade development in U.S. Foreign Trade Zone 81, with sites in Portsmouth, Dover and Manchester. Because the New Hampshire Trade Zone is designated by the U.S. government as an international trade zone, goods are protected from customs duties and excise tax until their formal entry into the United States. The Port of Portsmouth, managed by NHPA, is the only deep-water harbor between Boston and Canada.

NHPA publishes The NH Port Directory, an annual international trade publication that explains port activity and services through Zone 81, export trade resources and Portsmouth pier specifications. Also serving as a resource directory, it lists air-cargo services, international accounting and

banking firms, trade consultants, customs house brokers, international warehouse services and a variety of other resources pertinent to export and import trade through Portsmouth. NHPA also works closely with other state and federal organizations interested in promoting international trade.

Small Business Development Center (SBDC) and New Hampshire International Trade Association (ITA)

The SBDC located at the University of New Hampshire (UNH) in Manchester has traditionally provided international trade training and counseling services as part of its overall business counseling for the small business community.

The ITA was established in 1982 and located at the UNH Durham campus within the Whittemore School of Business and Economics. At that time, ITA conducted workshops and coordinated discussion groups in cooperation with the SBDC in Manchester. In 1984, the ITA moved its operation to the SBDC site at UNH in Manchester, which continues to be its administrative home.

Through 1987, the ITA's operation was small. The organization's major role was to facilitate larger businesses' provision of insight and experiences about export trade to small businesses, to publish periodic newsletters and co-sponsor a World Trade Expo. In January 1988, the SBDC dedicated funds from a U.S. Economic Development Administration (EDA) grant to the administration of the ITA program in order to expand services to members.

Services now include a regular newsletter, access to fax services and an International Business Library, Job Bank information, legislative issue updates affecting foreign trade, a service industry referral list, counseling and consulting services. ITA sponsors Roundtable Dinner Presentations throughout the year, a two-day New England Export School and World Trade Expo through a network of five other international trade resource organizations, once each year. Through the ITA, a UNH consultant from the Whittemore School

of Business at UNH monitors the state's international trade performance each year. Unfortunately, EDA funds that were used to expand ITA were cut substantially in 1989 and will be eliminated in 1990. New sources of funds are needed to continue program operation and expansion.

Other State Initiatives: Teacher Education and the Legislature

New Hampshire has shown leadership in its effort to instill in elementary and high school students and teachers an understanding and appreciation of international issues. New Hampshire and Rhode Island are the only states that require teachers to take international geography as part of their education for certification. In addition, the Department of Education through its Council on World Affairs operates conferences and workshops in conflict resolution in international affairs. With this initiative, New Hampshire is one of only twelve states across the nation sponsoring in-service training of an international nature.

The State Board of Education requires all secondary-school students to complete a course in business and economics which includes an international component. New Hampshire has shown leadership in introducing international awareness into the public schools, affording New Hampshire residents the opportunity to become internationally aware regardless of whether they pursue higher education, where students are generally more likely to be introduced to international issues.

With support from both of the state's major business associations (the Association of Commerce & Industry and the Business & Industry Association) the Legislature passed legislation in May 1989 (effective July 1, 1989) establishing a committee to study methods on promoting New Hampshire businesses and products overseas. The Committee consists of House and Senate members and representatives of the Division of Economic Development, state

business associations, the SBA, the governor's office, the ITA, the Port Authority and the chair of an academic advisory committee, also established by the act. Academic advisors represent the business schools of UNH, Dartmouth College and Plymouth State College as well as the UNH SBDC and Franklin Pierce Law Center. The committee report, which is to include recommendations for proposed legislation to be introduced in the 1991 legislative session, is expected to be complete by June 30, 1990.

New Hampshire World Affairs Council (WAC)

Since the 1950s, the WAC has provided educational programs for secondary-school teachers, students and all New Hampshire residents. The programs deal with foreign affairs, politics, economics and history and focus on U.S. relationships with the rest of the world. WAC programs include public lectures and conferences, foreign-visitors programs, study tours for adults, study tours for secondary-school students, a monthly bulletin, secondary-school teacher institutes and reference services.

Particularly impressive are WAC's programs for teachers and students. In the 1988-89 academic year, WAC held three institutes for teachers and seven regional conferences and three study tours for high-school students. Located in Durham, the WAC regularly draws on UNH faculty, and occasionally uses faculty from other major universities, to lead various programs and seminars.

The state Department of Education in conjunction with the Japanese Society of New Hampshire and the Japanese Consulate in Boston sponsored an intern in 1986 from Kobi University. This intern worked with elementary and secondary schools as a general educator and ambassador.

Chambers of Commerce

The Chambers of Commerce for the Exeter Area, for Merrimack and for Greater Portsmouth actively promote international trade in New Hampshire. The Greater Manchester Chamber of Commerce works closely with the ITA to promote trade development. For example, the Chamber co-sponsors seminars on exporting.

Two Key Programs for Consideration by New Hampshire Leaders

Regional, state and local economic development groups in Massachusetts working with regional offices of the federal government have designed an important program in conjunction with seven Boston-area colleges and universities.

Known as BEST (Boston's Export Strategy Team), this cooperative effort by Boston-area graduate business schools is designed to help local companies identify and develop strategies to capture foreign markets for their products or services. BEST is based on a prototype designed by the Wharton School of Business at the University of Pennsylvania and is similar to a UMass-Amherst program that has served the business communities of central and western Massachusetts for more than five years.

BEST may serve as a prototype for initiatives by colleges, universities and local economic development and trade organizations serving specific regions within each New England state (see Appendix for details on BEST).

Working with the business schools at Dartmouth, UNH and Plymouth State College, the ITA could effectively establish a program similar to BEST to better serve small businesses interested in exporting. These three graduate business schools are strategically located to serve much of the state's small-business community effectively.

A second important program was established in Massachusetts approximately three years ago. With funding from the Legislature, which leveraged matching

funds from private and public sources, five global education centers were created at colleges and universities to serve local school districts throughout the state. Through these centers, a wide variety of international resources is made available to school teachers serving grades K-12.

The New Hampshire Department of Education's cooperative efforts with the World Affairs Council could be greatly expanded by creating global education centers at four-year colleges and universities throughout New Hampshire.

Findings and Summary Remarks

Part II of this paper explains that New Hampshire's export trade position in 1986 shows relative strength across six important industries. Particularly impressive was the export performance of non-electrical machinery, electronics, paper products and rubber products in terms of their rates of growth over 1984 exports. Moreover, New Hampshire's national ranking between 1980 and 1986 in employment related to exports as a percentage of civilian employment improved from 13th in 1980 to eighth in 1984 and seventh in 1986.

The total value of New Hampshire's exports increased by 47 percent from 1984 to 1986. In this capacity, New Hampshire leads the region. In terms of what share of the value of all manufactured products became exports, New Hampshire's 18 percent is second only to Vermont among the New England states. Clearly, significant growth in export trade has been an important aspect of New Hampshire's economic growth.

The lure of low business taxes has been viewed as New Hampshire's chief strength in promoting economic development in the 1980s.

This approach has served the Granite State well to date, as indicated by the several measures which rank New Hampshire as a leader in business growth. Much of this growth has occurred among high-tech companies expanding into

southern New Hampshire from the Greater Boston Area, and lower state taxes apparently have provided impetus.

Yet there are signs of a weakening economy in New Hampshire, similar to that which already has impacted Massachusetts. The problems are not as severe as those that led to the Bay State's economic slowdown. But they do exist. They include: increased cost and uncertain supply of electricity; limited availability of labor; and the rising cost of housing -- all factors that may eventually discourage business growth and worker migration to the state.

In the past, New Hampshire's low taxes have perhaps given the state an advantage over others. The lower level of public spending in New Hampshire simply has not been a realistic option in other industrial states. The state's small, homogeneous population has been rural in nature. The state has enjoyed low levels of crime and high levels of educational attainment that have not required as great a public investment as in other states.

During the 1980s, New Hampshire has maintained the highest levels of SAT performance in the nation. In addition, a large percentage of high-school students take the tests.

State educational accomplishments, however, show a sign of weakness on another front. The percentage of students dropping out of high school has increased from 23 percent in 1982 to 27 percent in 1987. With economic growth and new community development occurring at such a rapid pace, New Hampshire may also be losing some of its cultural homogeneity. In the coming years, more public services may be required to sustain quality of life for New Hampshire residents. It is critical that New Hampshire continue monitoring demographic changes that require the attention of state policymakers.

The strength of economic and export trade development, as well as education and training initiatives aimed at enhancing further economic development in New Hampshire, depends on the degree to which state and

nonprofit organizations coordinate the provision of services, maximizing the benefits of scarce resources. All technical training providers, export trade promoters, four-year institutions of higher education and state and local economic development offices have created appropriate coordinating councils in order to share resources where possible and avoid duplication.

This analysis has found that the resources of New Hampshire's educational and developmental infrastructure are strained. If greater levels of services are needed, more resources will be needed.

In order to strengthen resources to support continued growth of export trade, we recommend consideration of the following points:

- More permanent funding would allow the World Trade Association to serve state businesses in a comprehensive fashion.
- Only one professional in the state Department of Economic Development is responsible for expanding export trade while little attention has been given to foreign investment tasks. Both are tall orders for one person.
- No state-initiated product development fund is available to assist with the start up of new technology-based companies that might spin off from university R&D and/or research being conducted by small high-tech companies. Such funds tend to enhance the technology transfer process, and result in economic gain within a state. New Hampshire should study whether there is a need for such a state fund.
- The effectiveness of job-training programs in meeting the labor needs of state businesses would benefit from evaluation. Rhode Island has established a national model for funding training initiatives that might be considered in this evaluation (see Appendix for details on Rhode Island's Workforce 2000 initiative).
- New Hampshire has not established any trade offices in other countries. The state could benefit from a cooperative effort with Maine and Vermont to establish such offices. By jointly establishing trade offices in key export markets, the upper-tier states of New England could maximize benefits through resource sharing. Vermont established an office in 1986; Maine currently has no such office.

IV. HIGHER EDUCATION AND INTERNATIONAL ECONOMIC COMPETITIVENESS

The Need for Higher Levels of Education, International Awareness and Expanded Research, Development and Technology Transfer

Because New England's economy increasingly is fueled by advanced technologies, skilled labor is critical to continued growth. International economic competition adds further to our demands for a well-educated workforce, heightened levels of R&D and subsequent technological innovation. But there are signs indicating we are falling behind our economic competitors in these fundamental areas. On a national basis, the facts are disturbing:

Education and Training

- Between 20 and 30 million adults in the United States are considered functionally illiterate.
- A 1987 survey of 5,000 high-school seniors in seven cities found that nearly 40 percent of Boston high-school seniors could not name the six New England states.
- Participation and achievement by U.S. elementary and secondary-school students in science and math lag when compared with the performance of previous years and with the performance of students of other nations. Our middle- and high-school students have scored at or near the bottom on international math exams for the last several years. In addition, high-school graduates in both Japan and West Germany, our major economic competitors, are stronger in basic educational skills. Merry I. White, an analyst of Japanese educational policy, suggests that Japanese high-school graduates are as well-educated as American college graduates and that any worker at a Japanese factory can be expected to understand statistical material, work from complex graphs and charts and perform sophisticated math.
- Although we boast that 50 percent of our high-school graduates go on to college, only 70 percent of U.S. students complete high school with their graduating class, compared with Japan's 98 percent. "Their bottom half is beating our bottom half," according to economist Lester Thurow.
- U.S. professional service industries complain about the dearth of qualified workers for entry-level jobs. U.S. manufacturers are finding it difficult to recruit workers who can understand robotics and computers.

- An estimated 75 percent of today's U.S. workforce will need retraining by the year 2000.

- Recent studies suggest that U.S. universities are not turning out enough scientists and engineers--particularly at the master's and doctoral degree levels -- to meet new demand in the leading-edge areas of high technology and advanced production systems. The number of engineering doctorates decreased from 2,500 in 1970 to 1,280 in 1985. In addition, only 53 percent of the engineering doctorates awarded by U.S. colleges were awarded to U.S. citizens or permanent residents. A shortage of top-quality applicants is expected to greet the retirement of a generation of aging science and engineering faculty.

- Top-quality students are being steered toward the lucrative professions of finance and law, creating a brain drain in manufacturing industries. The study of manufacturing processes is being neglected.

International Awareness

- Only 17 percent of U.S. public elementary schools offer any form of foreign-language instruction.

- The United States is one of the few developed nations where students routinely graduate from high school without competence in a second language. Although foreign-language requirements for graduation from independent four-year colleges and universities increased from 25 percent in academic year 1983-84 to 30 percent in 1988-89, such requirements at public four-year institutions inched from 9 percent to just 10 percent in those years, according to a national survey. In the United States, a student can earn a doctorate without ever having taken a foreign-language course. Nonetheless, the language of trade remains the language of the customer. If we do not understand the customer, we will be unable to trade our goods, services and ideas.

- U.S. students, workers and consumers lack understanding of global geography and of the cultural and political differences between nations. Economic development and trade association leaders told NEBHE staff that this lack of international cultural awareness is one of the most significant hurdles they face in encouraging export trade by New England businesses.

R&D Investment and Technology Transfer

- The U.S. leadership position in R&D expenditures of 25 years ago faces a serious challenge. In 1962, the U.S. spent 2.7 percent of GNP on R&D, compared with 1.5 percent in Japan and 1.3 percent in West Germany. By 1985, the U.S. figure was still 2.7 percent, but Japan's was 2.8 percent and West Germany's was 2.7 percent. Relative to gross national product, non-defense R&D expenditures by the United States were well below both Japan's and West Germany's in 1988. Japan spent 2.8 percent of GNP on non-defense R&D in 1985, and West Germany spent 2.5 percent. The United States spent only 1.9 percent.

- Although the United States leads the world in advanced technological industries, the annual growth rate of these industries between 1972 and 1985 was 7.6 percent, compared with Japan's 14 percent, suggesting Japan is more effective in technology transfer for high-quality product development.

- 1987 marked the second consecutive year that foreign companies topped the list of U.S. patents awarded. Japanese companies were first and second, bumping General Electric to third.

Education In The Global Economy

International competitiveness requires educational effectiveness. Having earned worldwide respect, New England's systems of higher education have at hand tremendous resources to share in solving the states' problems of economic competitiveness on several levels.

Many of the problems we face in terms of lagging worker competence and lacking international awareness have traditionally been viewed as problems of elementary and secondary education. But we can no longer afford to make that distinction. The strength of the U.S. system of higher education depends on the strength of education at lower levels. International economic competitiveness rests on the strength of both systems. For this reason, viewing the educational process as a continuum will allow more effective long-term solutions to the problems presented by the global economy.

In terms of basic literacy skills and educational level, the nation's workforce presumably falls around the middle when compared with that of other industrialized countries. But as our products become more highly technological and our markets become global, literacy demands increase dramatically. And the United States trails even some developing countries in initiatives on literacy, basic education and worker retraining. As a result, the United States faces competition from developing countries, which not only have lower labor costs, but also make stronger efforts to train skilled, literate workers.

New England faces an additional challenge. The number of New England's high-school graduates is projected to drop so fast that by 1994, the region will have 158,261 -- or 17 percent -- fewer high-school graduates than would have been the case if high-schools continued to graduate as many students as they did in 1988.

In a region whose economic "miracle" has been fueled by brains rather than brawn, this story from the high-schools is very grim indeed.

The demographic changes upon us reinforce a few simple notions: New England's future economic well-being depends on our willingness to invest in education today. And we must extend the benefits of education to all New Englanders, whether they are members of minority groups who have not participated fully in higher education and the workforce, welfare recipients who may need further education and training to find good jobs and become independent of public assistance, or currently working people from chief executive down, whose skills must be upgraded constantly to keep pace with increasingly sophisticated business practices and formidable foreign competition.

Literacy and Education in New Hampshire

New Hampshire ranks 9th in the United States and first in New England in terms of adult literacy. Nonetheless, <u>illiteracy</u> is an important problem for New Hampshire, particularly as the state's economy becomes more knowledge-intensive. Approximately 9 percent of New Hampshire's adult population was considered illiterate in 1985.

In 1982, the average SAT score of New Hampshire students was 925. Average scores peaked at 939 in New Hampshire in 1985. But they declined to 938 in 1987 and to 933 in 1988. Still, New Hampshire led the nation in average SAT scores for all four of these years. What is even more impressive,

however, is the relatively high number of New Hampshire students who take the exam. This number has grown steadily. In 1982, 56 percent of New Hampshire high-school graduates took the exam. In 1985, the figure rose to 57 percent; in 1987, 65 percent; and in 1988, 68 percent. New Hampshire ranked sixth nationally in this capacity in both 1982 and 1985, and fifth nationally in 1987 and 1988.

In recent years, however, New Hampshire has experienced a decline in the national rank of its high-school graduation rate. Ranked 11th nationally in this capacity in 1982, the state had dropped to 29th by 1987. Though 77 percent of New Hampshire students graduated with their senior class in 1982, only 73 percent did in 1987.

In 1980, New Hampshire ranked an impressive 13th nationally (fourth in New England) in the percentage of people age 25 and older with a college education. In New Hampshire, 18 percent of people over age 25 were college-educated, compared with the national average of 16 percent. New England's average is a comparatively strong 19 percent.

Though New Hampshire fares well in some measures of educational attainment, declining high-school graduation rates and adult-literacy rates should be improved. State government, business and education leaders must realize that raising the educational level of the population is a long-term proposition, and quick fixes simply will not work. Raising the educational levels of New Hampshire's young people in the short term will help cope with adult illiteracy in the long term, while leaders devise strategies to deal with the adult illiteracy that now exists.

Science and Engineering Education: Fueling a Knowledge-Intensive Economy

NEBHE completed a study in 1988 to assess the progress made by New England colleges and universities in supplying sufficient numbers of quality

engineering graduates to meet industrial demand. The NEBHE research showed that New England ranked first among all regions in enrollment of graduate students in science and engineering per 1,000 population.

More detailed analysis shows that the region has responded fairly well to estimated demand in engineering and related fields at the baccalaureate level. But it is increasingly clear that insufficient numbers of engineering doctorates are being awarded to meet the regional and national demand of high-technology companies and university faculties.

In New Hampshire, the University of New Hampshire (UNH) and Dartmouth College grant engineering degrees. A state-specific analysis of both institutions' capacity to meet the demands of New Hampshire's industries would be enlightening.

With the nation's oldest engineering program, Dartmouth recruits students both nationally and internationally. Dartmouth baccalaureate degree awards declined considerably from 1982 to 1987, though master's and doctoral awards increased. UNH baccalaureate awards increased six percent from 1982 to 1987, while master's degree awards increased by 52 percent, and doctoral degree awards by 20 percent.

New Hampshire Initiatives to Heighten Levels of Education

The Corporation for Enterprise Development dropped New Hampshire's grade from "D" in 1988 to "F" in 1989 on the group's state-by-state report card on educational initiatives. By this measure, the state ranked 39th nationally in 1988 and 47th nationally in 1989. It ranked last in New England for both years.

The 1989 ranking was based on analysis of data from the 1987-88 academic year. That year, New Hampshire ranked 49th in K-12 spending per pupil as a percentage of per-capita income, and 50th in higher-education spending per student as a percentage of per-capita income.

New Hampshire's national ranking in terms of teacher salaries, however, was somewhat better, due partly to the severe teacher shortage that the state experienced over recent years. New Hampshire ranked 32nd in beginning teacher salaries and eighth in its rate of increase from 1981 to 1988. There was a 70-percent increase in this latter capacity.

The state's adult-literacy programs are coordinated by New Hampshire's Office of General Adult Education Services (GAES), an office within the state Board of Education. GAES programs include formal classes, basic skills (for adults whose skills are below the eighth-grade level) and high-school equivalency degree preparation courses.

These programs, held in 18 locations throughout the state, are supplemented by special volunteer tutorial programs offered in 223 communities in New Hampshire. The GAES staff select program sites through an open, competitive application process. Many New Hampshire businesses serve as sites for in-house basic instructional courses for employees. Several secondary vocational/technical training institutes and some community-based centers provide programs to a broader adult population base. Colleges and universities, though eligible, have not actively applied for funding for such programs. In the 1988-89 school year, statewide enrollment was almost 7,000, up 20 percent from the previous year.

With high-school graduation rates decreasing, it is important that large numbers of adults be enrolled to upgrade the skills of New Hampshire workers. Though adult basic education programs have increased from previous years, the state would benefit from a comprehensive study of the portion of illiterate adults that is actually being educated, particularly since New Hampshire suffers severe labor shortages. Educating more residents who have dropped out of the system will be important in correcting labor shortages.

Improving public schools and maintaining a strong economy were the top two public policy priorities of New Hampshire business, government and education leaders surveyed in NEBHE's 1987 Future of New England Survey.

New Hampshire respondents to the survey emphasized the importance of improving public schools by suggesting that higher education might more effectively join in partnership with the broader community to improve the quality of teacher education. In addition, these leaders stressed the importance of enhanced communication through collaborative partnerships among the education, business and government sectors.

Using higher-education resources to help solve specific problems at all levels of education makes good sense in any state. In New Hampshire, higher-education facilities are strategically located throughout the state. School districts in each area, whether urban or rural, may continue to effectively join together with higher-education and business leaders to address pressing issues such as worker retraining and adult literacy.

A unique higher-education consortium allows New Hampshire colleges and universities to maximize their resources in a wide variety of cooperative ventures, as discussed below.

The New Hampshire College and University Council (NHCUC)

NHCUC was established 23 years ago as an association of 13 accredited, four-year public and independent higher-education institutions in the state. This consortium is designed to share resources to enhance learning opportunities for students. In addition to benefits accrued by the institutions and their students, several of the more than 14 types of initiatives undertaken through NHCUC also benefit public schools, businesses, economic development groups and government. The programs aimed at sharing resources and expertise with broad constituencies include a legislative

liaison program, a cooperative library-resource program and an office of collaborative education programs that shares expertise with public schools and the state Department of Education. An industrial consortium project allows colleges and universities to deliver training programs for groups of small companies in New Hampshire.

Lack of International Awareness

In 1987, NEBHE completed a comprehensive study of the ways New England colleges and universities were adapting curricula and related activities to provide the new understanding and competencies needed in a global economy.

Using a case-study approach, NEBHE examined 40 colleges and universities, including public and independent two-year and four-year institutions across the region. This research has been expanded and updated in conjunction with NEBHE's legislative briefing in New Hampshire. In its research, NEBHE has considered institutional planning, business and liberal arts curricula, foreign languages, area studies, internationalization within various academic disciplines, foreign-student enrollment, study-abroad programs and library resources.

The research has indicated that change occurring along the international dimension is one of the most powerful substantive developments in the history of higher education. But it also indicates that more must be done.

Campus-based International Initiatives

What follows is a sampling of campus-based activities to promote international awareness among New Hampshire residents:

- In 1982, Dartmouth College and the University of New Hampshire established international centers. Both the Dickey Endowment for International Understanding at Dartmouth and the Center for International Perspectives at UNH advance and facilitate multi-disciplinary teaching and learning of international affairs.

- UNH's Whittemore School of Business and Economics encourages an international focus in its programs. Only 40 percent of a student's courses must be taken within the business school, allowing students to pursue dual majors through the Center for International Perspectives.

- Keene State College's strategic plan outlines the importance of teaching students to adopt a global perspective. International education is being fused into the liberal arts and general education curricula to ensure such a perspective. Likewise, Dartmouth College requires a non-Western culture course. UNH requires a foreign-culture course for all undergraduate students.

- Through the UNH Center for International Perspectives, students are afforded the opportunity to create a dual major that includes international affairs. First-year students take an interdisciplinary sequence of three core courses following a global-political, global-economic and global-scientific theme. Second and third-year students gain competence in a foreign language, complete four elective courses in a foreign study, science, economics, or public policy, each with an international focus and study-abroad component of at least one semester. Fourth-year students take a senior seminar in international affairs. Upon its inception in 1982, the Center enrolled 100 students. There are now approximately 250 students enrolled.

- Dartmouth College is one of 11 independent institutions nationally that are part of a consortium, organized by Yale University with major foundation support, to focus on problems of foreign-language instruction.

- With some interruptions, Dartmouth College has been teaching Chinese language since 1902, and has reported a substantial increase in demand for its program. Over 50 students take first-year Chinese. With a second-year program in Beijing for only 25 students, the college is considering establishment of a second program in Taiwan to accommodate interested students. The present arrangement with Beijing provides for a professor from Beijing to come to Dartmouth as a visiting professor to provide a third, intensive year of language study for students. Both the Chinese history and Chinese religion courses at Dartmouth attract more than 100 students.

- A German-Dartmouth Distinguished Professorship Program was established at the College in 1987. Through its unique funding mechanism, the West German government gives Dartmouth $70,000 per year for 10 years for program support, while Dartmoutn raises matching funds that are placed in a trust. The program will be fully endowed by 1997. This project marks the first such agreement that West Germany's Cultural Affairs Deparment entered into with a foreign university.

- Dartmouth College created a Middle Eastern language program in 1987, offering Arabic and Hebrew for its students.

- UNH's Center for International Perspectives manages several university exchange programs for students, faculty and administrators. The Brazil program is the most active. Travel funds from the University Exchange Program of the Partners of the Americas has enabled UNH to establish a major faculty exchange program and several collaborative projects with the Federal University of Ceara, located in New Hampshire's Brazilian partner state. More than 28 members of the UNH community recently traveled to Brazil.

- UNH's Center for International Perspectives and the university's New England Center for Continuing Education conducted a two-day program for the broader community in April 1988. "Experience Brazil" was designed to empower those who do business and travel in Brazil to gain an understanding of the history, language and customs of this nation. Fifty-five individuals participated in the program. The Center for International Perspectives has also offered summer institutes for public school teachers and is beginning to encourage academic alliances between the schools and foreign-language professors on campus.

- Canadian studies are also a focus in New Hampshire colleges and universities. Keene State offers several Canadian Studies courses. Plymouth State hosts an annual Canadian Conference, and conducts summer workshops in Montreal for teachers. Dartmouth College established the Institute of Canada and the United States as part of its John Sloan Dickey Endowment for International Understanding. This institute sponsors the annual Pearson-Dickey Conference in cooperation with the Canadian Institute on International Affairs at the University of Toronto. The Quebec Studies journal is edited at Dartmouth College.

- The New Hampshire campus of New England College (NEC) has an overseas campus in England. More than half of NEC-New Hampshire campus students study at the British Campus and comprise approximately 40 percent of the student population of the campus in England. In addition, other students attending four-year institutions are eligible to enroll at the overseas campus under the New Hampshire College and University Council's student-exchange agreement; students take courses at their home-campus tuition rates through the NHCUC agreement.

- In the field of international business, UNH has joined four other land-grant institutions of New England (UConn, UMaine at Orono, URI, and UVM) in offering a joint program in Grenoble, France. The five universities alternate sending professors to Grenoble to run the program. UConn handles the program's administration on an ongoing basis.

- Each academic year, Dartmouth's Dickey Endowment for International Understanding provides more than 20 students with internship opportunities at United Nations agencies around the world.

- In 1989, the UNH School of Health and Human Services signed an agreement with the Leningrad State Lesgaft Institute for Physical Culture that will lead to the exchange of teachers and students of physical education between the two institutions, as well information sharing and collaborative research.

- Keene State College President Judith Sturnick represented the American Association of State Colleges and Universities (AASCU) on a September 1989 trip to the Soviet Union sponsored by the U.S. State Department. AASCU's Office of International Relations and the USSR State Public Education Committee entered into an agreement in 1987 to promote educational exchanges between the two countries. The focus is cultural cooperation in research and technology.

- Ignorance of international affairs on the part of U.S. citizens has been called a threat to national security and is the focus of a national report on international education being drafted by top U.S. educators, including Colby-Sawyer College Professor Antoinette Iadarola, Provost and Dean of the Faculty. Papers will be presented to institutions of higher education and to business and political leaders across the nation.

- New England College of New Hampshire has sister-college agreements with Aichi Gakusen University in Japan and King Alfred College in Winchester, England. Antioch/New England Graduate School offers a British Teacher Exchange Program.

- Notre Dame College each academic year conducts a Global Awareness Week for students.

Through early 1987, New Hampshire colleges and universities, like their counterparts in other New England states, had concentrated their internationalization efforts on curriculum development. Although many of these initiatives have been unique and impressive, comprehensive curricular planning has lacked focus on economic issues.

While foreign-language enrollments have risen sharply after a decade of decline, few business students study foreign languages. And there is very little global business perspective in liberal arts programs, even though most liberal arts students eventually go to work for companies that are directly or indirectly involved in world trade.

In addition, very few overseas business internships are available. Likewise, very few post-doctoral research fellows are given funding for overseas research positions. And those who do go overseas generally must complete a second post-doctoral assignment in the United States in order to be adequately connected to secure future employment. As a result, these research fellows are discouraged from going abroad.

Foreign-Student Enrollment

Growth in foreign-student enrollment in New England as well as in the nation has flattened during the 1980s in relation to the tremendous growth that took place in the 1960s and 1970s. But foreign-student enrollment in New England slowed to a lesser extent. The number of foreign students in New England grew from 23,191 in 1983-84 to 27,702 in 1987-88, growth of less than 20 percent over the four-year period, but still substantial, compared with the national increase of 5 percent (339,000 to 356,000).

More troubling is the relatively small number of Americans studying abroad. According to the Institute of International Education's 1986-87 "Open Doors" survey, 48,483 Americans were studying for credit abroad, compared to 349,609 foreign students studying for credit in the United States. Equally striking: while 80 percent of the Americans were studying in Western Europe and only 5.4 percent were studying in Asia, students from Asia represented about half of the foreign students in the United States. New England has proportionately more students from Europe and Canada and fewer from Asia than does the nation as a whole. Institutions in the three northern New England states have been especially attractive to Canadian students. But the asymmetry of the foreign-student exchange is further revealed in how foreign and American students respectively choose their fields of study.

Foreign students are learning an enormous amount about science,

engineering and business management in the United States. U.S. students overseas are learning almost nothing about science and business in their host countries. Primarily, these U.S. students abroad are studying fields associated with U.S. undergraduate curriculum, such as Western history, philosophy and culture.

More must be done to encourage study-abroad in our institutions of higher education, not only in Western nations but throughout the world. In addition, the foreign students here in New England could serve as tremendous resources of cultural knowledge, not just for college students and faculty but for students and teachers in middle schools, high schools and for the general public.

Business and Higher Education Lack Coordination

NEBHE's 1987 case study analysis of 40 New England colleges and universities suggested that leaders of the region's businesses, governments, economic development agencies and trade associations were increasingly focusing on international issues on a track parallel to that of the region's colleges and universities, but that efforts by the different parties were rarely coordinated.

Although higher education has international resources relevant to the business community, and foreign investment tends to be attracted to areas offering educational advantages, New England communities have not yet developed business-higher education partnerships for <u>international</u> economic effectiveness. Moreover, little has occurred at the state level to foster such relationships. Business leaders have expressed growing interest in the international economy, yet continuing education and executive development programs related to international business issues were, and still are, lacking.

It is critical that efforts be made to broaden the dialogue and improve international awareness among students, faculty and citizens in general.

R&D Investment

New England's leading edge in basic research is striking and gives the region a major competitive asset in the international marketplace. But the nation's ability to transfer research-generated knowledge to the world marketplace will be crucial to the nation's trade future and the careers of today's undergraduates. Yet on a national basis, technology transfer has not been adequate to transform research into economic gain. Many discoveries born of American research become products made by other foreign competitors. Students, businesses and policymakers do not have an effective network to apply new knowledge on a timely basis.

The New England region relied upon informal relationships between university researchers and resulting spinoff businesses through the 1970s. In the early 1980s, economic policymakers and research universities across the nation begin to understand the serious implications for all sectors when regional economies failed or stagnated. The result was a concentrated effort to enhance university-based technology transfer and technical assistance initiatives in order to nurture the diversification of local economies.

But because the recession of the early 1980s did not affect the New England states as severely as states in other regions, the promotion of technology transfer and technical assistance has lagged in this region. Now, as the region's economy seems to be peaking and international competition is intensifying, purposeful action is critical to sustaining long-term economic development.

The nation's long-term commitment to research and development has created a seedbed for new industrial products and processes, enhanced innovative capacity and productivity gains. Federal funding of basic and applied research has been vital in sustaining a prosperous economy. Research activity also has created a partnership among government, business and academia, which is responsible for the nation's international leadership in scientific and technological discoveries. Since World War II, federal support for basic and applied research has grown substantially. New England organizations have been leading recipients of the federal funds.

The region's strong R&D infrastructure allowed for the evolution of the computer industries of the 1970s, as well as developing industries of the 1980s, such as biotechnology, artificial intelligence and software engineering. Nurturing R&D is crucial for further state and regional economic development.

New Hampshire's Share of Federal R&D

New Hampshire has seen steady improvement in R&D funding to all organizations during the 1980s. Ranked 42nd nationally by this measure in 1980, the state ranked 33rd in 1986. Federal R&D funding to New Hampshire organizations was approximately $50 million in 1980, but increased 165 percent to almost $136 million by 1986.

Approximately 55 percent of all federal funds awarded to New Hampshire in 1980 were from the Department of Defense (DOD). But by 1986, 72 percent were DOD funds. Conversely, Health and Human Services (HHS) dollars represented almost 18 percent of the total state share in 1980, but only 12 percent by 1986. This HHS money includes funding from the National Institutes of Health (NIH).

New Hampshire ranked 35th nationally in DOD funds in 1985, but jumped to a ranking of 29th in 1986. The state's rank in HHS funds also improved -- from 43rd in 1985 to 36th in 1986. In funds from NASA, New Hampshire dropped from 17th in 1985 to 28th in 1986.

New Hampshire's proportionate growth in DOD funding seems to coincide with a similar growth in industry as the major recipient of state-directed funds. Whereas 35 percent of all federal R&D funds were obligated to New Hampshire industries in 1980, 55 percent were in 1986. The college and university share dropped from 35 percent to 23 percent during this same timeframe. The impressive overall growth of R&D funding to the state has occurred overwhelmingly in defense-related funds directed to industry.

University-directed federal R&D funds to New Hampshire grew by 24 percent from 1980 to 1986. Funds from HHS and the Department of Education in New Hampshire represent the highest portion of total fund awards. HHS funds account for 36 percent of the total, while Department of Education funds account for 23 percent. Awards from the National Science Foundation (NSF) accounted for 9 percent, while those from NASA accounted for just under 9 percent. U.S. Department of Agriculture (USDA) funds represent 8 percent of the total. Commerce Department funds account for slightly more than 6 percent of the total -- a higher percentage of total funds to colleges and universities than in any other New England State. All other agency awards accounted for less than 3 percent of the total award.

Dartmouth College ranks 11th and UNH ranks 17th among the top recipients of federal R&D obligations in New England.

UNH ranked among the top 20 universities regionally in funds from five federal agencies: first in Commerce funds; second in NASA funds; fifth in USDA funds; 13th in NSF funds; and 17th in HHS funds. Dartmouth College ranked among the top 20 regional universities in funds from three federal agencies: ninth in HHS funds, 10th in DOD funds and 11th in NSF funds.

R&D Expenditures at Colleges and Universities

Colleges and universities receive R&D funding from several different sources. In addition to those awarded by the federal government, funds are received from state and local government, industry, internal institutional sources and other more minor sources. R&D expenditures provide a glimpse of the kinds of research strengths that exist at colleges and universities.

In terms of R&D expenditures, New Hampshire colleges and universities closely mirror national averages with one important exception. Only 3 percent of R&D expenditures in New Hampshire are from industrial sources, versus the nation's 6 percent and New England's 7 percent averages.

State and local governments contribute a substantially greater share of R&D funding to New Hampshire colleges and universities -- 7.6 percent -- than the New England average of 2.3 percent. This New Hampshire figure is only slightly less than the national average of 8.4 percent. New Hampshire's state and local government expenditure for R&D of $3.10 per capita almost matched the national average of $3.67, while the New England average is only $1.77. Approximately 70 percent of all university R&D expenditures in New Hampshire were received from the federal government. This is higher than the U.S. average of 62 percent, and almost the same as New England's 72 percent average.

Though more than half of New Hampshire's R&D expenditures are allotted to the life sciences (55 percent), colleges and universities (broken down by academic discipline) are strong in three other important areas: almost 18 percent are expended in physical science research; 11 percent in environmental science; and 9 percent in engineering.

UNH ranked in the top 100 public universities nationally in R&D expenditures in 1986, at 92nd. Dartmouth College ranked 34th among independent colleges and universities across the nation. UNH ranked 17th nationally in 1985, up from 20th in 1984, for <u>public</u> institutions in relation

to research expenditures per faculty member, suggesting that, for its size, the university fares well in R&D funding. Dartmouth College posted a 1985 ranking of 7th among independent institutions of higher education, up from 19th in 1984.

National Institutes of Health Funding (NIH)

New England ranked first among all regions of the nation in terms of federal R&D funds to all organizations and in university-based R&D expenditures on a per-capita basis. With only 5.3 percent of the nation's population, New England captured 9.3 percent of federal funds awarded to universities nationally. The region spent 9.4 percent of national university-based R&D funding from all sources.

Perhaps the most impressive statistic, however is the region's No. 1 per-capita rank in NIH awards. Almost 15 percent of all NIH R&D awards went to New England in both 1986 and 1987.

In 1987, Dartmouth College ranked 84th among all domestic institutions and 70th (up from 96th in 1986) among all institutions of higher education in total dollar awards from the NIH. Dartmouth Medical School ranked 58th in total funds awarded by NIH to medical schools across the nation.

Summary Remarks

New England's national leadership in university-based R&D funding is firmly established. New Hampshire's base, though small, has grown considerably in recent years. UNH and Dartmouth College provide the bulk of New Hampshire's strength in this capacity. Dartmouth Medical School provides a competitive advantage in biomedical research. Dartmouth College itself, like UNH, shows strength in the physical sciences and engineering research. UNH also shows strength in environmental science research.

Though levels of R&D funding in New Hampshire aren't significantly high when compared to other states, the state shows strength in technology transfer and technical-assistance initiatives, as discussed in the following section.

Technology Transfer and Technical Assistance

In the areas of technology transfer and technical assistance, some of the nation's colleges and universities have taken creative steps to help improve the health of local economies. Various initiatives have expanded technical and entrepreneurial assistance in economic and community planning; worker retraining; science and engineering technology transfer; and consultations to small and medium-sized firms.

Examples of such technology-transfer initiatives include: the creation of new business/university research parks; university industrial-liaison programs, scientist-exchange programs; and technical and administrative support to university researchers interested in moving basic research forward for application. Some universities have provided incubator space at research facilities for new business ventures and established joint venture capital funds, as well. A sampling of New Hampshire's university-based initiatives follows.

Technology Transfer

- UNH has created an Industrial Research and Consulting Center that matches the intellectual and technical resources of the university with the needs of business and industry. Services provided by the center include product development; long-range research and planning; modeling; software development; technical troubleshooting; feasibility studies; development of laboratory testing procedures; market analyses and risk analyses. The center coordinates the patents application process of inventions developed at UNH and licenses such technology to the private sector. Serving as the university's technology broker, it has arranged hundreds of research and consulting contracts, matching university resources with the interests of business and industry.

- Under agreement will Roan Ventures of Manchester, UNH has established a business incubator, providing office space, clinical support staff and marketing resources to researchers with projects for development.

- UNH has established interdisciplinary research institutes and centers to advance state-of-the-art R&D across traditional disciplines. These institutes and centers include: the Biomedical Engineering Center; Space Science Center; Water Resources Research Center; Institute of Marine Science and Ocean Engineering; Institute for the Study of Earth, Oceans and Space; Center for the Humanities; and the Institute for Policy and Social Science Research.

- UNH shared in an NIH award of $3 million in 1987 with five university and non-profit research institutes across the country. The three-year grant funds research into the chemo-preventative properties of the trace element selenium in diets.

- The Dartmouth College Thayer School of Engineering in 1989 established the innovative Roan of Thayer business incubator. This incubator provides researchers with the facilities and support required to get entrepreneurial efforts off the ground. In exchange, the college benefits academically from having the entrepreneurs on campus and benefits financially over the long-term if the business is a success. The Synthesis Group is one of the pilot companies in the incubator program. Established by two 1988 doctoral recipients from the Thayer School, the Synthesis Group is developing system-level macro-models and abstraction tools that describe complex computer circuits in very simple ways in order to help clients think through, simulate and market integrated software for both digital and analog hardware systems.

- Graduate students at the Dartmouth College Thayer School of Engineering are afforded the opportunity to attend the Bangkok-based Asia Institute of Technology (AIT). Dartmouth graduate students are given an opportunity to study the very different engineering challenges facing another part of the world by attending AIT, often called the "MIT of Asia."

- In 1987, a joint venture between Dartmouth Medical School and the New Jersey medical firm Essex Chemical Company was established in Hanover, New Hampshire to commercialize certain monoclonal antibodies. The company's product is designed for multiple applications through a technology capable of attacking numerous diseases through antibody-dependent cell killing. Medarex is the medical school's first joint-venture company.

- Dartmouth College's Office of Industrially Sponsored Research publishes an easy-to-use resource directory that provides information on the depth and breadth of research activities at the college. With the goal of developing further ties with parties in government, business and at the college, the Directory of Research outlines research activities of the medical school faculty, the faculty of arts and sciences and the Thayer School of Engineering.

- In 1988, Dartmouth College broke ground on the $218 million Dartmouth-Hitchcock Medical Center. Scheduled to open in the early 1990s, it is expected to be one of the most advanced centers anywhere.

- In 1988, Dartmouth Medical School established a Center for Clinical Outcomes Research aimed at determining what works and what does not in everyday medical practice.

Technical Assistance

- Faculty members at the UNH Whittemore School of Business and Economics conduct and supervise a substantial amount of graduate-level research related to state economic and business activity. Professor Evangelos Simos has analyzed New Hampshire's export trade performance for the Small Business Development Center located on the UNH, Manchester campus. Professor Peter Keen supervised a 35-graduate-student study of the state's lodging and travel industry, producing a 300 page report that reveals geographic areas that are saturated as well as areas offering room for expansion.

- UNH Whittemore School Professor William Wetzel established the first venture-capital network linking entrepreneurs and investors in New England. As a not-for-profit operation, the Venture Capital Network (VCN) has introduced hundreds of entrepreneurs to several investors each. Professor Wetzel has also helped other organizations around the nation establish their own VCNs -- in Indiana, at SUNY at Plattsburgh and Northern Michigan University and with the Chamber of Commerce for Ontario. Wetzel's work is based upon a study entitled "Informal Risk Capital in New England," conducted in 1981 with a grant from the Small Business Association.

- A Dartmouth College professor of mathematical social sciences has developed a computer-generated "corporate atlas" that has mapped corporate directorates among nations. It has shown the existence of weak ties among European communities slated for Europe's single-market approach in 1992. His research has important implications for U.S. economic planning related to international trade.

- Franklin Pierce Law Center has created the Germeshausen Center for the Law of Innovation and Entrepreneurship and a master's program in Intellectual Property to provide technical assistance related to the technology-transfer process.

- Several colleges and universities have created collaborative initiatives with public schools, and are conducting summer educational institutes for students and teachers. They include: at UNH, a School-University Collaborative in Teacher Education, and a Live, Learn and Teach Summer Learning program for students; at Magdelen College, a summer program for high-school students; at Dartmouth, a Computer Learning and Information Process Program (CLIPP) for students and a tuition-free semester for students fulfulling teacher-certification requirements to encourage more students to choose the teaching profession as a career; at Rivier College, the Challenge Program for gifted elementary-school students, and an Adopt-a-School liaison program; and at Franklin Pierce College, the Project Soar for Gifted Children and The Institute for Teacher Certification and Professional Development.

Coordinating Efforts

As noted previously, NEBHE's 1987 case study revealed that campus efforts toward internationalization were not coordinated with those of business, government and the economic development community. Research conducted in conjunction with the preparation of this briefing paper has found that in 1988 and 1989, more is happening to foster this coordination.

University faculty and administrators have traditionally shared their work within academia. On the relatively rare occasions when findings have been shared beyond the academic community, this information has generally been shared at the national level. Only in the last few years has attention shifted to the state level. There does seem to be a growing cooperative relationship between higher education and the business community of New Hampshire. But state policymakers who could benefit significantly from academic research are not being reached as effectively. More could be done to enhance higher education's benefit to the broader community.

New Hampshire's public and independent institutions of higher education are a tremendous resource that could benefit the state in a broader spectrum of ways. State policymaking could be informed far more significantly by university-based research for the broader community's benefits.

Because this reaching out to an expanded community is new to many college and university faculty members, leaders of higher education should foster such public service among faculty. Complicating this is the fact that faculty promotion and tenure are often based strictly upon teaching and publications, leaving little time for service to the broader community. Particularly in the case of publicly funded institutions which often include community service as part of their mission, more should be done to encourage faculty to serve on community agency boards; create alliances with local schools; provide policy analysis to local government; and counsel small business in export trade. Government and business leaders must take care to foster a broader relationship with higher education.

Despite areas that clearly need improvement and expanded cooperation, New Hampshire campuses, businesses, government offices and economic development groups have recently initiated the necessary planning to begin ensuring global economic competitiveness for the state. Important steps in building this foundation include: Providing the state Department of Industrial Development, the International Trade Association and the New Hampshire Port Authority with resources to enhance international trade. In addition, appropriate funding of higher education allows expanded technical assistance, upgraded levels of education, a more internationally aware citizenry and broadened technology transfer and incubator programs.

V. Recommendations

The following recommendations aim to enhance New Hampshire's response to the challenge of global economic competitiveness. Many of these recommendations do not relate strictly to higher education initiatives, but require the diversity of talent that exists in the academic community in partnership with business and government leaders.

Education and Training

To leaders of state government, business and higher education:

1. Create campus-based global education centers to:
   - Help local teachers at all levels upgrade basic education;
   - Develop model instructional materials to accomplish this;
   - Coordinate university-based speakers bureaus to encourage early interest in science, math and engineering careers;
   - Expand opportunities for science and math education in smaller rural areas through telecommunications.
   - Devise creative ways to improve high-school graduation rates.
2. Use university resources, coordinated by the state Department of Industrial Development, to initiate a study of statewide industrial supply and demand for scientists and engineers.
3. Through the state Occupational Information Coordinating Committee, evaluate whether training programs are effectively meeting the labor shortage needs of state industries. Consider an evaluation of Rhode Island's Workforce 2000 Council as a model for expanding education and training programs for workers and welfare recipients, without significant state spending (see Appendix for details of Workforce 2000).

International Awareness

To leaders of state government, business and higher education:

4. Use global education centers to:

   - Assist local teachers at all levels in introducing an international focus to curricula;
   - Expand opportunities for a wide variety of foreign-language study in elementary, middle and high schools, as well as international affairs courses in high schools.

5. Establish a mechanism for New Hampshire businesses and the state to fund study-abroad programs in non-Western regions.

To leaders of Higher Education:

6. Provide more opportunities for high-school students to participate in foreign-language and international affairs programs at campus-based summer institutes. Also use the summer institutes to provide teachers at all levels with new internationally focused curricular resources.

7. Consider reinstating language requirements for admission to four-year institutions.

8. Focus on the global economy in liberal arts and in general education to familiarize undergraduate students with international issues that will have an impact upon their lives and careers.

9. Expand dual-degree programs, particularly for business and engineering students, so they can gain knowledge of a specific world region, learn a foreign language and have opportunities for overseas internships related to their fields of study.

10. Attempt to build a presence on campus of foreign students from all world regions, and encourage their involvement in programs designed to heighten international awareness among New Hampshire students and local residents.

11. Encourage New Hampshire companies doing business abroad to assist in expanding internship possibilities for students.

12. Initiate continuing education and executive development programs in international business, international affairs and foreign languages, with particular emphasis on international management courses and programs for engineers, managers and other personnel in high-technology industries.

To the New England Board of Higher Education:

13. Undertake a regionwide review to determine which of New England's trading partners or potential trading partners are inadequately served by campus-based area studies centers and other international resource centers, and encourage creation of new centers to fill the gaps.

14. Encourage new and existing area studies centers and other international resource centers to:

    - Establish semester exchange programs among the six New England states, focusing on international affairs, foreign language, liberal arts and business;
    - Share relevant studies on trade, regulatory, monetary and economic development policy with government agencies and legislators as requested throughout New England;
    - Provide seminars and literature for New England business people who want to begin exporting or expand current export operations;
    - Develop relationships with foreign institutions to provide a framework for faculty and student exchange, as well as joint research and curriculum development opportunities.

15. Create and disseminate a comprehensive guide to academic centers, trade associations and state and nonprofit organizations that offer resources to enhance international economic competitiveness in New England.

R&D Investment, Technology Transfer and Technical Assistance

To leaders of state government, business and higher education:

16. Establish a statewide technology transfer council with representatives of business and appropriate university-based research centers to monitor:

    - Current and future needs for research parks;
    - The adequacy of seed money and venture capital;
    - The need for incubators for new companies;
    - Scientific and technological strengths that could be nurtured for economic diversification.

17. Establish a mechanism for businesses and the state to provide funding for expanded seminar programs, allowing exchange between university R&D staff and industrial R&D staff.

To leaders of higher education:

18. UNH should expand its capabilities in advanced research, public policy and area studies to increase involvement in state-specific policy studies and technical assistance for New Hampshire's long-term economic and international trade development.

19. Create interdisciplinary institutes between schools of business and engineering to develop an integrated approach to competitiveness (Rhode Island College's Center for Industrial Technology as well as MIT's Leaders in Manufacturing Program serve as models for such an initiative).

20. Through graduate schools of business, coordinate efforts with economic development agencies and trade organizations to make more technical assistance available to local busniesses. (Boston's Export Strategy Team serves as a model for such an initiative -- see Appendix for details).

21. The six Land Grant Colleges of New England should devise a coordinated computer database for the region to generate needed demographic and economic data relevant for timely state planning (The California Almanac provides a good model for such an undertaking).

22. The New Hampshire College and University Council should coordinate the creation of an annual directory of individual faculty research expertise to include activities of the public and independent institutions of higher education in the state. The directory should be disseminated to high-technology companies and international business people for use as a resource guide. Dartmouth College already completes an institutional directory that could serve as a model.

23. Consider ways to evaluate community and public service provided by faculty as additional criteria for tenure and promotion.

To the New England Board of Higher Education:

24. Assist research universities, technology-based companies and New England state governments in evaluating ways for faculty, post-doctoral students, and industrial engineers and scientists to pursue research sabbaticals in other nations.

25. Engender and coordinate a regionwide technology transfer council to monitor state-level technology transfer issues and create solutions for commonly shared technology transfer problems for the entire New England region.

International Trade Development

New Hampshire lacks several of the mechanisms that other New England states have put in place to support continued economic development and export growth. As the dollar's value rises, programs to enhance export trade may become necessary to assure economic growth in the state. The following steps are offered for consideration.

To leaders of state government:

26. Find ways to secure adequate funding for trade missions led by the Office of Industrial Development and for the International Trade Association.

27. Consider joining with Maine and Vermont to establish trade offices in other countries. Vermont established an office in Japan in 1986. Maine currently has none. By jointly establishing offices in other countries, northern New England could maximize benefits through resource sharing.

28. Evaluate the need for a state-funded product development venture capital program or seed fund.

APPENDIX

Massachusetts Global Education Centers Programs

All global education centers provide teacher training and curriculum resources to public-school teachers. A discussion of more specific activity at the centers follows.

- Clark University Teachers Center for Global Studies serves Central Massachusetts (28 participating cities and towns):
  - Offers workshops, seminars, forums, a speakers bureau, a summer institute and library resource materials to assist teachers in geography, world history, U.S. history, economics, foreign languages, English, humanities and the sciences
  - More than 250 public school teachers participate annually. More than 1,800 benefit directly, and more than 19,500, indirectly
  - State funding has leveraged contributions from Clark and other private sources
- Framingham State College, Schweitzer International Resource Center for Teachers serves Metro West area outside Boston (16 participating cities and towns):
  - Provides a network of faculty experts who work one-on-one with local teachers to create curriculum packages aimed at meeting needs of specific grade levels
  - Offers workshops on educational competitiveness and international knowledge bringing area business leaders and school superintendents together for discussion
  - One conference on the Pacific Rim attracted 100 teachers
  - Professionals from other nations have participated in various programs at local schools through coordination by the Center
  - State funding has leveraged contributions from other public and private sources
- Tufts University, International Studies Resource Center for Teachers serves Boston, Cambridge and eight surrounding towns:
  - Offers professional development workshops and seminars for local teachers, focusing on Africa, China, Japan, the Middle East and Vietnam
  - Conducts the Geography Workshop with the Massachusetts Geographic Alliance (supported by the National Geographic Society)

- Through the Fletcher School of Law and Diplomacy at Tufts, sponsors a speakers bureau, which sends foreign students into local classrooms

- Provides a linkage between public schools and the extensive resource library of the Massachusetts Global Education Project in Winchester

- Serves more than 400 teachers annually

- State funding has leveraged substantial contributions from Tufts and other private sources

- UMass-Amherst, International Studies Resource Center for Teachers serves four western Counties (21 participating cities and towns):

  - Spearheaded the formation of the Western Massachusetts Consortium for Global Education, combining the strengths and resources of local international and teacher organizations. The Consortium recently published a major resource directory that catalogs all international teaching resources in western Massachusetts

  - Has linked the Center's global environment resources directly to area schools for use by science teachers through a $5,000 computer system donated by Digital Equipment Corporation

  - Offers a summer institute and a series of eight regional workshops for teachers

  - State funding has leveraged other public and private contributions

- Wellesley College, The Global Education Resource Center for Teachers serves Greater Boston Area (18 participating cities and towns)

  - Offers after-school workshops, seminars, forums, a newsletter, and library

  - Sends international students directly into school classrooms

  - Offers a summer institute that provides professional development in areas studies including Latin America, the Far East, Africa, the Soviet Union and the Middle East

  - More than 1,500 public elementary and secondary-school teachers are served annually

  - State funding has leveraged contributions from Wellesley College and other private sources

WHAT YOU SHOULD KNOW ABOUT THE

B.E.S.T.

Boston's Export Strategy Team

What is BEST?

BEST is a cooperative effort by leading Boston-area graduate business schools to help local companies identify and develop strategies to capture foreign markets for their products or services. By combining university research talent with the expertise and resources of local economic development and trade organizations, BEST offers companies a unique opportunity to understand and pursue their export potential.

Who should participate in BEST?

BEST is specifically designed for Boston-area companies serious about making the most of their export potential.

How will BEST work for you?

Participation in BEST provides your company with three basic services:

1. A Practical Guide for Implementing Your Export Program. A professional market analysis and feasability study, prepared by a graduate student consulting team closely supervised by a business school faculty member in international marketing will provide your company with an export strategy. This will include recommendations on:

- o alternative export markets
- o marketing objectives
- o marketing strategies
- o product adjustments
- o promotion mix
- o distribution channels
- o pricing strategies

2.) Speakers on Export Topics. Trade experts will offer practical perspectives on important export topics: on the "nuts and bolts" of exporting as well as current trends. Specific topics will be chosen to reflect your company's particular export concerns. The discussions will center on developing strategic responses to assist you in strengthening your position in international trade.

3.) Ongoing Assistance. Through its public and private sector sponsors, BEST will assist you further in obtaining information and services necessary to implement your export program. Organizations such as the World Trade Institute, Massport's Foreign Trade Unit, the State's Office of International Trade and Investment, and the Small Business Administration will help BEST clients take advantage of their respective trade libraries and data bases. The City of Boston's Economic Development and Industrial Corporation (EDIC), and the Massachusetts Industrial Finance Authority (MIFA) will provide financing assistance to exporters.

Who are the business schools involved in BEST?

The business schools involved are:

- Babson College
- Bentley College
- Boston College
- Bunker Hill Community College
- Northeastern University
- Suffolk University
- University of Massachusetts/Boston

Who are the organizations participating in BEST?

Public and private organizations involved in the program include the:

- City of Boston's Economic Development and Industrial Corporation (EDIC)
- International Coordinating Council (ICC)
- International Business Center
- Massport's Foreign Trade Unit
- Massachusetts Industrial Financing Authority (MIFA)
- State's Office of International Trade and Investment (OITI)
- Small Business Administration (SBA)
- Small Business Association of New England (SBANE)
- World Trade Institute

What does it cost to participate in BEST?

A $200 fee is charged to participate in BEST. It covers the incidental costs students will incur during the semester in preparing the feasibility study (phone calls, transportation, printing, etc.) and the administrative costs of running the overall BEST program.

For further information about BEST, please give one of us a call.

Andrew Bendheim Massport, 439-5560
Paul Horn EDIC/Boston, 725-3342

Charlie van Nederpelt
Boston College, 552-3167

August, 1988

Boston's Export Strategy Team

B.E.S.T.

A Program to Assist Small Businesses in the Exploration of International Marketing Opportunities

A cooperative effort of Boston-area Business Schools and International Trade Organizations

Workforce 2000 Council

Workforce 2000 and its funding mechanism, the Job Development Fund were created by law in June 1988 to improve current and long-term employment and advancement opportunities for residents, while enhancing the competitiveness of Rhode Island businesses through customized job training and retraining, promotion of worksite-based literacy programs, and outreach programs for the unemployed and economically disadvantaged. In just six months, training and upgrading of skills have been provided for over 600 residents of Rhode Island.

Workforce 2000 is funded in two ways. A total of $500,000 has been appropriated from the state's administrative budget to provide for council staff. And one-tenth of one percent of the state's unemployment insurance liability fund has been earmarked for training purposes, accounting for approximately $4 million annually, according to projections. Thus, no new tax funds must be generated.

The Council's executive board includes the presidents of the University of Rhode Island, Rhode Island College, Community College of Rhode Island, business leaders, and state government representatives from the departments of Economic Development, Administration, Human Services, Elderly Affairs, Employment Security, and the Commissioners of Education and Higher Education. Various economic development organizations are also represented.

The Council solicits training proposals on a competitive basis. Eligible applicants include Rhode Island employers, business and trade associations, public and private educational institutions and agencies, non-profit agencies, JTPA agencies, organized labor organizations and state agencies.

The program has purposely been designed to be open-ended and flexible in order to best meet specific training needs for various businesses in the state. Clearly this program serves as a national model for state inititative to improve the quality and availability of the workforce. It has been recognized by the U.S. Department of Labor as such.

14. Trade Profile for New Hampshire

Although New Hampshire has the smallest volume of trade with Canada of the six New England states, it is a significant amount for the state's size -- almost $500 million total in 1986. Canada exported $311 million and New Hampshire exported $186 million to Canada, for a trade deficit of $125 million in 1986. This trade balance favors Canada with 63 percent of the trade between them being shipped from Canada to New Hampshire. However, Figure 6 illustrates the fact that New Hampshire maintains a surplus in the trade of finished goods. In general, finished products carry higher tariffs and are more protected than other goods.

New Hampshire Exports

On the export side, New Hampshire ships a large amount of fabricated and crude materials to Canada, as well as a somewhat smaller amount of finished goods (see Figure 6). Crude wood materials are the state's leading export, amounting to $73 million in 1986. Paper and paperboard are another big export to Canada, with $45 million in 1986.

New Hampshire also ships smaller amounts of lumber, wood pulp, plastics, petroleum products, and textile fabrics. Canada depends on New Hampshire for some of its food, including $10 million worth of fish in 1986, $3 million worth of fruit, and $2 million worth of meat.

In finished goods, New Hampshire ships a variety of products to Canada in moderate amounts. The leading finished product is telecommunications equipment, with $8 million shipped in 1986. This equipment faces high tariffs in Canada, up to 17.8 percent, which the FTA would phase out over ten years. Other electronic goods shipped to Canada from New Hampshire include computers and semiconductors. These goods face smaller tariffs of up to 3.9 percent which the FTA would eliminate immediately in the case of computers and over five years for semiconductors. Computer software, an enormous industry in the New England region, is not addressed directly by the FTA.

Figure 6

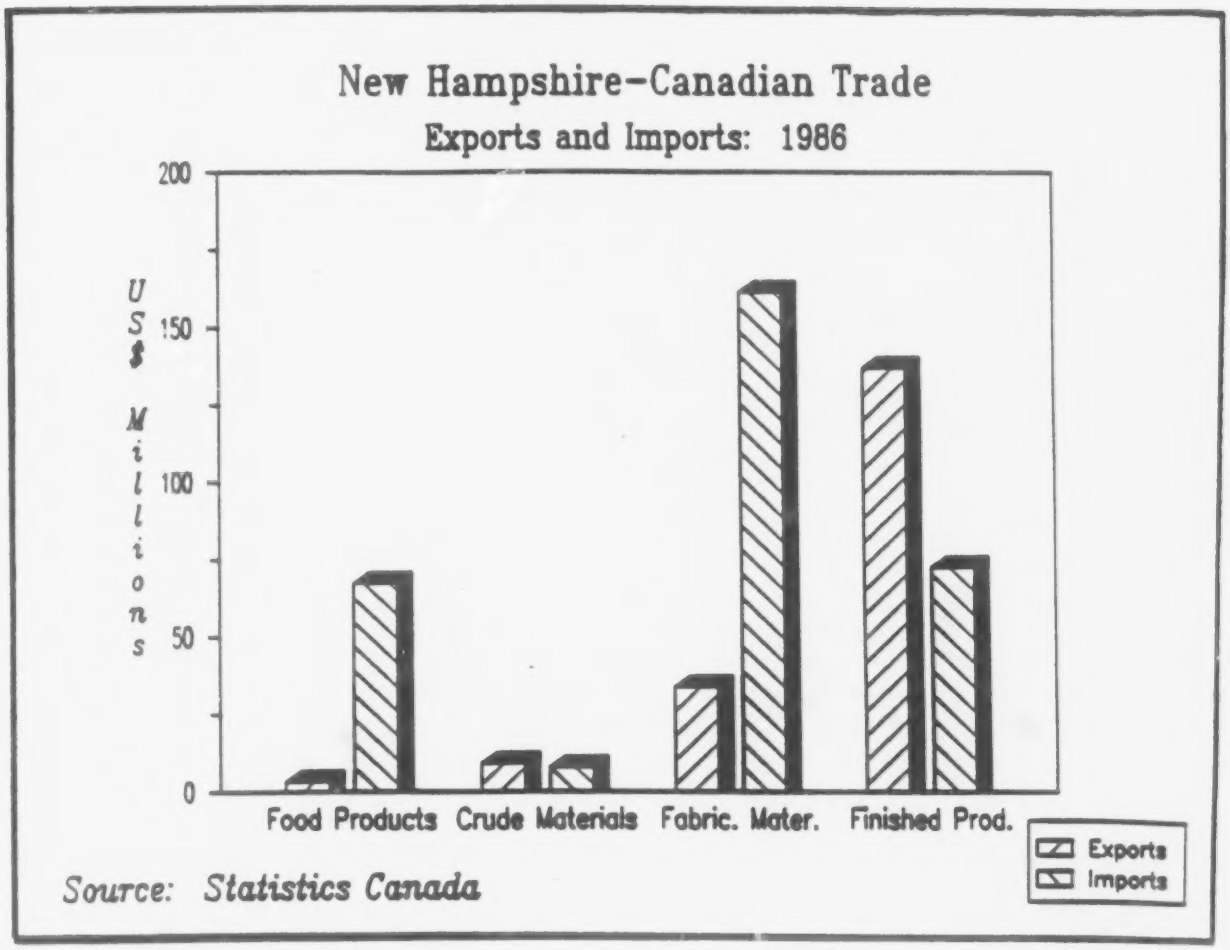

New Hampshire-Canadian Trade
Exports and Imports: 1986
US $ Millions
200
150
100
50
0
Food Products
Crude Materials
Fabric. Mater.
Finished Prod.
Exports
Imports
Source: Statistics Canada

Table 9
Leading New Hampshire Exports to Canada
By Major Commodity Category: 1986

Commodity	U.S. $1000s	Percent of total category
Food, Feed, Beverages, Tobacco		
Live Animals	1,730	52
Fish and Fish Products	1,266	38
Food and Food Materials	162	5
Meat	33	1
Fruit	30	1
Total for leading five exports	3,221	98
Total for commodity category	3,296	
Crude Materials		
Crude Wood Materials	7,625	83
Metal Ore, Iron and Scrap	399	4
Fur Skins and other Crude Animal Products	183	2
Rubber, Gums and other Crude Vegetable Products	176	2
Wool and Fine Animal Hair	125	1
Total for leading five exports	8,509	93
Total for commodity category	9,194	
Fabricated Materials		
Lumber	7,890	23
Organic Chemicals	6,651	20
Hardware and other Basic Metal Products	3,200	9
Paper and Paperboard	3,193	9
Plastic Materials	1,859	5
Dyes, Paints and other Chemical Products	1,690	5
Fabrics of Natural and Man-made Fibers	1,599	5
Metals, Plate and Basic Forms	746	2
Abrasives and other Non-metallic Basic Mineral Products	678	2
Petroleum and Coal Products	509	2
Total for ten leading exports	28,015	83
Total for commodity category	33,834	

(Table 9 continued)

Commodity	U.S. $1000s	Percent of total category
Finished Products		
Computers	28,207	21
Motor Vehicle Parts	19,768	14
Printing Machinery	15,287	11
Other Industrial Machinery	14,619	11
Electrical Property and Measuring Equipment	12,599	9
Electronic Parts and Equipment	9,384	7
Aircraft, Engines and Parts	6,215	5
Engines, Bearings, Turbines and other Basic Industrial Machinery	5,080	4
Containers and Closures	2,673	2
Printed Matter	2,648	2
Apparel and Footwear	2,583	2
Tools and Equipment	1,813	1
Film and Photographic Goods	1,709	1
Total for 13 leading exports	122,584	89
Total for Commodity Category	137,036	

SOURCE: Staff calculations from Statistics Canada, "Domestic Exports/Imports to/from the U.S.A, January to December, 1986."

Motor vehicle parts are another leading New Hampshire export. This trade is regulated by the Auto Pact, as described in the automotive section of this report. Other finished goods shipped from New Hampshire to Canada include electrical lighting and equipment, industrial machinery and tools, sanitation and safety equipment, containers and closures, and footwear.

New Hampshire Imports

New Hampshire, like other New England states, depends on Canada more for natural resources and crude products than for capital and labor intensive finished goods. As shown in Table 10, well over half of the products that New Hampshire imports from Canada are crude or partially fabricated products.

The state's top Canadian import is lumber, primarily softwood, with shipments valued at $56 million in 1986. Lumber currently is imported duty-free into the United States, but Canada charges its own industries a 15-percent export tax on softwood to protect the U.S. softwood industry. Because the New England region does not have a large softwood industry, this export tax has the effect of making prices higher for New England buyers for the benefit of other U.S. regions with bigger softwood industries.

Metals are another leading import from Canada, especially steel and basic metal fabricated products such as rods, plates, and pipe. Canada shipped $50 million in metal products in 1986. These products face U.S. tariffs of up to 7.5 percent, which the FTA would eliminate over ten years. Other crude and fabricated products shipped to New Hampshire include wood pulp, newsprint and other paper, wood fabricated products, petroleum and coal products, and textile fibers.

New Hampshire also imports a significant amount of fish and processed fish products from Canada -- $51 million in 1986. Frozen or fresh unprocessed fish comes into the United States duty-free. The FTA would preserve this status, theoretically stabilizing the price level and supply of fish. Other food products shipped from Canada to New Hampshire include meat, sugar, and whiskey and other beverages.

Finished goods, as previously mentioned, constitute a smaller portion of New Hampshire imports from Canada but still made up $73 million of the trade in 1986. Leading this category is motor vehicles and parts, with $11 million in

Table 10
Leading New Hampshire Imports from Canada
By Major Commodity Category: 1986

Commodity	U.S. $1000s	Percent of total category
Food, Feed, Beverages, Tobacco		
Fish and Fish Products	50,542	75
Meat	5,093	8
Sugar and Sugar Preparations	4,649	7
Whiskey and other Beverages	4,223	6
Feeds and Fodder	1,118	2
Barley, other Cereals and Cereal Products	911	1
Total for six leading exports	66,535	99
Total for commodity Category	67,427	
Crude Materials		
Textile Fibers	4,591	58
Asbestos and Crude Non-metallic Minerals	1,251	16
Crude Wood Products	690	9
Oil Seeds, Nuts, Kernels and other Crude Vegetable Products	660	8
Metallic Ores and Scrap	42	1
Total for five leading exports	7,235	91
Total for commodity category	7,949	
Fabricated Materials		
Lumber	56,092	35
Metals and Basic Metal Products	50,244	31
Wood Pulp	20,082	12
Newsprint	11,941	7
Shingles, Plywood and other Wood Products	7,200	4
Petroleum and Coal Products	6,638	4
Paperboard and other Paper	6,189	4
Total for seven leading exports	158,385	98
Total for commodity category	161,478	

(Table 10 continued)

Commodity	U.S. $1000s	Percent of total category
Finished Products		
Prefabricated Buildings and Structures	9,391	13
Telecommunication Equipment and Parts	9,204	13
Drilling, Excavating and Mining Machinery	7,244	10
Motor Vehicle Parts	6,259	9
Hand Tools and Equipment	5,070	7
Motor Vehicles	4,937	7
Specialized Industrial Machinery	4,741	7
Engines, Generators and other General Industrial Machinery	4,423	6
Office Machines	4,001	6
Agricultural Machinery	1,867	3
Heating and Refrigeration	1,257	2
Measuring and Lab Equipment	1,226	2
Containers and Closures	1,189	2
Apparel and Footwear	889	1
Printed Material	809	1
Total for 16 leading exports	62,507	86
Total for commodity category	72,738	

SOURCE: Staff calculations from Statistics Canada, "Domestic Exports/Imports to/from the U.S.A, January to December, 1986."

1986. Other leading finished goods imported from Canada include prefabricated buildings, telecommunications equipment, industrial machinery and equipment.

Summary

New Hampshire would benefit from the provisions of the FTA in boosting its exports to Canada. Most of the state's exports to Canada are in finished products, which often face the highest tariffs. Elimination of these tariffs help the U.S. producers be more price competitive.

The state's computer industry, one of the top employers, would certainly be a beneficiary of the FTA's elimination of tariffs on computer equipment. The software industry might not receive immediate benefit, but future discussions of intellectual property rights are proposed by the FTA. Other electronics industries would also benefit from the removal of tariffs.

The auto parts industry would be assured of the status quo on U.S.-Canadian trade of these goods. Auto parts are currently shipped duty free, and the FTA would not change this.

Industrial machinery producers, who have been staging a recovery from hard times, could be further stimulated by the elimination of fairly strict tariffs on these goods.

Other New Hampshire industries which depend on Canada for supplies of raw materials would benefit from the assurance of lower costs of these materials, which include lumber, steel, wood pulp and other products.

ERRATA

The U.S.-Canada Free Trade Agreement
"A Study of the Costs and Benefits to New England"

On pages 63 and 67, the following section should be inserted in place of the existing New Hampshire Exports.

NEW HAMPSHIRE EXPORTS

On the export side, New Hampshire's shipments to Canada are mostly in finished goods, with small amounts of fabricated and crude materials (see Figure 6). As shown in Table 9, computers are the state's single leading export, with shipments valued at over $28 million in 1986. The New Hampshire computer industry would immediately benefit from the FTA's removal of the 3.9 percent tariff.

Industrial machinery is another important export to Canada, with shipments of printing, textiles, plastics, and other machinery valued at almost $30 million in 1986. The industrial machinery manufacturers have faced depressed sales in the last several years but are rebounding with increased orders in the early part of 1988. Industrial machinery faces tariffs of up to 9.2 percent when shipped to Canada, compared with U.S. tariffs of up to 5.1 percent. Tariffs on machinery would be eliminated over five years, starting on January 1, 1989. The FTA's liberalization of this trade could add momentum to the industry's recovery.

Other leading exports from New Hampshire to Canada include motor vehicle parts ($20 million in 1986), electronic parts ($9 million), lumber ($8 million), as well as smaller shipments of aircraft and parts, chemical products, hardware and paper. Motor vehicle parts trade, which would remain covered under the 1965 Auto Pact, is explained in greater detail in the automotive section of this report.

Appendix 16

END

U.S. Dept. of Education

Office of Education
Research and
Improvement (OERI)

ERIC

Date Filmed

March 29, 1991